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THE PROBLEM OF SEX EDUCATION.

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The Public Interest. One of the few things upon which educators are agreed is that children should be instructed in matters of sex. For several years past this question has been receiving increasing attention in educational and sociological publications, and its importance is being more and more stressed. This does not necessarily mean that vice and venereal disease are growing, for the contrary may be the case. But it does mean that through research the results of the social evil and its accompaniments have been traced out; that this information has been disseminated, and that a more sensitive public conscience than of old has been quickened to meet the long-standing demands of the situation. Laymen everywhere, and especially parents, will follow the struggle with this problem with as keen an interest as they will regard anything of an educational nature.

Disagreement As to Methods. But as soon as one has observed that there is agreement on the need of sex instruction, he must pause. For there is utter absence of accord when we come specifically to ask who shall give this instruction; where, when and how he shall give it; and finally what shall be given. To the writer it does not seem rash to predict that in four or five decades we may be offering what is needed, and doing it effectively, through more than one avenue, by various methods, at divers times and places. But just now Babel reigns. Some say the work must be done by the parents;

others declare that the agency must be free literature spread broadcast, or classes conducted by physicians or other specially-equipped persons; still others will place this new duty upon the regular teacher in the public school. Some would develop it out of nature study in the grades; others would approach it *via* the high school classes in biology, and a few would cut the Gordian knot off short at what they consider the appropriate time without "approaching" it at all.

No Scientific Data for Judgment. While we flounder in this uncertainty, amid nearly as many opinions as there are holders of opinion, it may be permissible for one who, as high school principal for several years had the seriousness of the sex situation called repeatedly to his attention, to offer his views. They are largely theoretical, in small measure empirical, which clearly classifies them with about everything we have on the subject. Actual experimental evidence on this point will accumulate very slowly, since the experimenter cannot complete his test in a month, check it by a "control" group and publish his "per cents." in a forthcoming periodical.

A Fundamental Requirement. Now, if the first requirement is that *sex shall be taught,* the range of possible teachers is lessened. Those who contend for the primacy of the home are holding to an ideal which all admire, but which is merely an ideal and utterly impractical in our generation, though it may not always be so. As society's demands multiply we are finding that there is scarcely anything that the home can be trusted satisfactorily to perform. One by one the various arts, intellectual and manual, have been rescued from domestic neglect or incapacity and transferred to the school. When we put the proposal to actual test, the home cannot be relied upon to teach sex. In some homes morals are loose or lacking, though this is comparatively infrequent. Millions of strictly moral parents refuse on flimsy pretexts to shoulder any responsibility, and many of the remainder are unable to teach sex any more than they can teach algebra. Free literature cannot meet the need; it finds the field already well filled with quack literature and advertisements within reach of boys especially. Occasional institutes or lectures do not reach the

masses. The school is the only organized agency that touches all the children, and only through it, by regular or special teachers, can we assure ourselves that *sex shall be taught.* No parent is thereby barred from co-operation in dealing with his child. All other suitable and reputable agencies may enter the field.

A Second Requirement. Educational history bears witness that much teaching has been a ridiculous waste—mere lessons, formally studied and perfunctorily recited. In this age the light of inquiry is being turned on every element of every new and traditional subject in the curriculum, and the question is always, "How does it affect the later life of the pupil?" When we look around we discover that hygienic instruction has failed to slump the tea or coffee market or "bust" the beer or tobacco trusts. It is therefore not enough that simple facts of sex shall be imparted, but *these facts must be given in a vital, dynamic way.* This emphasizes more than ever the need that the work shall be done by those who understand the nature and development of childhood and youth, and who know how to break through that reserve and sense of difference that unfortunately grows up between most children and their parents, culminating more or less unhealthily at adolescence.

An Unpedagogical Approach. Just what constitutes vital and effective method is not so simple to agree upon. But in the light of general pedagogy certain principles ought to stand out plainly. There is widely current an idea to the effect that the notion of sex difference and its place in nature can be gradually developed through many phases of nature study, such as the process of pollination in plants, the depositing of eggs and storing of food for the young by many insects, the nesting habits of birds, etc. Though no one has stated it precisely, doubtless it is expected to work from the oviparous to the viviparous idea, and finally up through the mammals to the constitution and purpose of the family as a human group. No one will object to the educative effect of such a training, but that it should be conceived as a pedagogical method of attacking the sex problem is beyond many.

No Need of An Approach. The technical purpose of a

method is presumably (1) to widen the scope of a child's interest by indissolubly connecting with some old interest something not hitherto of interest, and (2) to raise a problem in the child's mind. Now, neither of these two ends can be well achieved by the proposed method, because the problem of sex is in the normal child's mind before he reaches the fourth grade, and the only reason why we hear so little of it during his pubescent years is because it has been crowded into the background by other active interests and by the repeated rebuffs with which his attempts to investigate have been met. And then, why should we advocate a long and, to the child, a tortuous approach to this absorbing interest? We do not hear it argued that the hygiene of breathing involves a study of the function of spiracles in grasshoppers, or gills in fish. No one thinks the hygiene of eating may be better taught if preceded by a study of the organs of prehension and mastication far down in the animal scale. Such work is entirely educative, but quite superfluous with respect to the ultimate end.

Danger of the Slow Approach. But there is a positive danger in the indirect method of approach, because the teacher has not had the courage, from the child's standpoint, to attack the problem directly. If the boy, as is very likely, has already had information or misinformation of sex matters through the spoken or written word or the action of his older boy associates, he is exceedingly quick to note what he considers a stealthy, because gradual, introduction of a subject which he has been told to discuss "only with the fellows." Hence his suspicions are aroused and strengthened instead of being disarmed; now he is sure there is a "skeleton in the closet." But the term *introduction* is a misnomer if the child has already had his introduction, and such is almost inevitable before he reaches the age at which the school is able to generalize the idea of sex.

The Scientific Attitude Toward Sex. A yet more fundamental error inheres in this idea of generalizing sex through nature study or later in high school biology, *i. e.*, an error of efficacy in sex instruction. All attempts to denude sex of all feeling, to disemotionalize it, are, in the writer's opinion,

doomed to failure. If scientific knowledge of the effect of narcotics cannot prevent numbers of our physicians from becoming "dope fiends," who will have the hardihood to claim that in a high school laboratory an adolescent can learn enough about sex to control his conduct thereafter? This is because emotion is more basic than mere information in determining ethical living. The latter leads to judgment, but the former impels to action; and the most casual observer can multiply illustrations of this principle to his satiety. Sex feelings are universally admitted to be instinctive, and, according to no less an authority than McDougall, have an unvarying, inseparable emotional correlate. It is possible that a considerable number of physicians after long experience are able to assume a *comparatively* unemotional attitude toward sex, but that children may be given a cold, scientific or intellectual regard for sex or anything else equally prominent in the evolution and survival of the race is chimerical. Nature does not leave such important matters to human reflection or judgment. Sterilization by education is impossible.

Emotions vs. Emotions. Like most contemporary writers on educational topics, the present writer finds his easiest task in telling how not to do it. Still, he would be false to his convictions if he closed without a few positive suggestions. The subject under discussion can be treated to advantage only by starting a back-fire against the impulse to sexual carelessness. The reproductive instinct is not so strong as instincts tending to self-preservation; the amorous emotion (in its unsocial manifestations) can be conquered by fear, disgust, self-respect and desire for the regard of others. If a skillful principal wants to decrease the use of cigarettes among his boys, he will not attack the practice necessarily through the physiology class, and certainly not from the physiological side alone. So in sex instruction we must seize on motives whenever and wherever we come upon them. No matter what the motive; if it *is* a motive, it can be made to count.

The Teacher of Sex. He who is called to the high work of instructing in this momentous subject should be no ordinary mortal. He must know his subject, and he must also know his pupils, the springs to their conduct, what attracts and what

repels. He must be able to command their confidence by his fairness and frankness and burning interest in what he is to impart. No apologist can for one moment succeed. Many a parent can do this excellently if he will. Most teachers ought to be able to do it, for their own sex at least, if they really possess those qualities which should make teachers the most useful of the world's men and women.

When Shall We Begin? That high school pupils are peculiarly ripe for this instruction is almost a truism, (1) because of the new dangers that are characteristic of their physiologic age, (2) because of their emotional susceptibility. If the State has a right to prescribe anything for every high school student, it should begin here. It is true that only one-fifth to one-twentieth of the children in different communities are graduating from the high school, but many others attend for a time, and the proportion is constantly increasing. If these can be reached at their peculiarly propitious age, there will soon be in every group of boys and girls almost anywhere one or more whose spirit shall have been stirred and whose ideals lifted up. And all such will become teachers of their less-favored fellows.

Still, there may be no impropriety, and possibly much wisdom, in carrying the gospel down into the grammar grades. The trouble comes in administration. Ideally, the writer believes there should be some differentiation on the basis of age between those under and those over 14. But then arises the difficulty of making the younger pupils feel that they are being dealt with frankly. Few of those below this limit are likely to profit by much instruction. At least, we shall all agree that there is some inferior age or grade limit to be set for sex instruction, though there probably should be no inferior limit set to the truthful, but guarded, answering of honest spontaneous questions from the children. The only way to establish our limit intelligently is to start in at the top of the school and work carefully down, surely not the reverse.

What Shall Be Taught? Sex instruction should not be stingy. Boys and girls have the same right to the vital facts here that they have to the vital facts in science, literature and history. Pubescents should be content with the names of vene-

real diseases, their visible effects and means of avoiding innocent infection. Such are the matters covered in the elementary school with reference to other contagious diseases. Adolescents in the grades should understand plainly how human life is transmitted, the culpable as well as the innocent methods of contracting venereal disease, the invisible and permanent results of the scourge and the effect of solitary vice. High school students before the end of their course would take the keenest sort of interest in the larger social aspects of these questions. A half-year course in "Social Problems" could advantageously be outlined, to be distributed in biweekly sessions over the entire four years, starting from the facts already imparted in the lower school and studying them in a more detailed way in relation to the physical and moral welfare of the individual. Next might come the evils of prostitution, the means adopted for their control and alleviation, the relation of licensed vice to municipal government and to other forms of crime, pandering and its detection and punishment. There should be a sociological (not a biological) study of the present status of the Lamarckian-Weismannian controversy and a careful consideration of devices for turning the principles of heredity to account in the treatment of criminals, lunatics, defectives, paupers and other delinquents and dependents. The end should be an appreciation of eugenics and its field. There is already available a vast amount of literature well adapted to the purposes of such a course, and well-chosen readings from this field should be in reach of all who are interested.

Coeducation or Segregation? The relation of the sexes in school is necessarily to be settled in connection with this teaching, and no doubt in different ways at different points along the route and according to the material presented. The regular force of teachers should be able to handle the instruction with less reserve or embarrassment, and they should get nearer to the pupils than special teachers. This can be easily managed along with sex segregation as far down in the system as departmental teaching goes. For children below the grammar grade segregation should hardly be necessary. The progress made in free and easy treatment of the subject will

determine largely how far coeducation can be carried. The further it can be followed with due delicacy the better will be the voice of those who approve coeducation as a general principle. If *none* of the topics suggested above can be treated by either men or women teachers before a mixed class of high school pupils, there has been a serious defect down the line somewhere.

An Objection from Abroad. Those who are alarmed at the possible effect of "Europeanizing" our educational treatment of the sex relation have overlooked the fundamental distinction between making the idea of sex too *common* and stimulating a *natural* attitude toward it as opposed to the present unnatural attitude. And even if it be admitted for the sake of argument that sex knowledge is imparted at a much earlier age abroad than it is here, and that it is made exceedingly common, it is a hasty sort of logic which paints existing or supposed conditions in foreign lands as a result of this knowledge. When we consider the greater density of population and stress of economic conditions abroad (factors which practically always are promotive of crime and vice), the historic inferiority of woman's position and vise-like grip of old national ideas, the dissimilarity and advantage of the New World are unmistakable. But, admitting also the validity of the conclusion that present conditions are wholly the outcome of different attitudes toward sex on the two continents, the argument of danger still fails; for the moment we consult comparative statistics of crimes against persons, sexual or otherwise, statistics of venereal disease, prostitution, divorce and intemperance, the conclusions come inevitably that somehow we have failed to realize our national advantages. The day is past when in a moral sense we may hold up the Old World as a "horrible example."

THE RESULTS OF GRADING THIRTEEN HUNDRED FEEBLE-MINDED CHILDREN WITH THE BINET-SIMON TESTS.

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The results reported in this brief account are on points that have been frequently discussed in this and other periodicals.* It is hoped that they may contribute something further on some of the more fundamental questions concerning the Binet-Simon tests. The method of treating the statistics here followed has not been employed heretofore, to my knowledge, in analyzing the results of a large number of examinations. The data may have a further interest in that the examinations of these 1300 children were all made by one person, the writer, thus eliminating the variable, personal factor of different examiners, which seems to have been responsible for considerable disagreement among different writers who have used the tests and obtained conflicting results.

A. Accuracy of the Individual Tests. Since it is not assumed in the Binet-Simon system that each individual test will always give exactly correct results, but only in a certain high percentage of instances, it is of the first importance to know just what this percentage of accuracy is for each test. Are the tests arranged in a series of increasing difficulty for the normally developing child, so that each test belongs in the age group in which it is found, and in no other? The best answer to this question should be given in the results with normal children of the different chronological ages. But since

*A fuller account will be found in the following: "The Present Status of the Binet-Simon Tests of Intelligence of Children," Jour. of Psycho-Asthenics, March, 1912; "The Binet and Simon Tests in Grading Feeble-Minded Children," Ibid, June, 1912; "A Revision of the Binet-Simon System for Measuring the Intelligence of Children," Ibid, Monograph Supplements, September, 1912.

such results assume the exact normality of the children chosen for this purpose, we can approximate accuracy only to the degree in which this assumption is correct. We can, however, determine the relative degree of difficulty of the individual tests without involving this assumption, and we may also determine in the same way whether any given test belongs in the age group in which it is placed rather than in a higher or lower age group. In the present study we have first treated the tests in each age group by themselves, and found the percentage of the number of times each test in an age group was passed by all the children that took that test, irrespective of the chronological or mental ages of these children. These percentages, then, indicate the relative degree of difficulty, for feeble-minded, of the individual tests in that age group. We next selected those tests that appeared relatively quite easy or quite difficult for their age groups and found what children of different mental ages, according to the system as a whole, did with these tests. If test VI-2, for example, is much more difficult than others in age group VI, what percentage of the children with a mental age of seven will pass this test? To avoid certain sources of error involved in using the results of feeble-minded children in this way, certain classes of children were eliminated. These are (1) the epileptic, (2) those with special sensory defects, chiefly deafness; (3) those with any serious motor disturbance, chiefly paralysis and choreiform movements; (4) children from whom, from a variety of different causes, the best responses they seemed capable of were not obtained. After these eliminations there remained 1006 cases.

In Table I the Roman numerals indicate the age groups of tests. The Arabic numerals, running 1, 2, 3, etc., indicate the individual tests in each age group. The numbering is that given in Goddard's account of the 1908 series of tests in the Training School and in my account of them in the Journal of Psycho-Asthenics, 1911. The large numbers immediately to the right of the Roman numerals are the number of children who took all the tests in the corresponding age groups. The numbers with the preceding plus and minus signs give the variations from the average per cent. with which all the tests

of an age group were passed, the signs indicating the direction of the variation. For example, test III-1 is relatively easy for its age group, the 21 being the difference between the average per cent. with which all the five tests in age group III were passed and the per cent. with which test 1 was passed by the 395 children. The figures in "black" type indicate the larger variations, showing the tests that are relatively quite easy or quite difficult. For these tests further results are given in Table II.

TABLE I.

I-II 255						III 395					IV 365			
1	2	3	4	5	6	1	2	3	4	5	1	2	3	4
+15	+12	+10	+6	−10	**−35**	**+21**	−17	−1	−4	0	+12	+17	−16	−11

V 526				VI 515							VII 469				
1	2	3	4	1	2	3	4	5	6	7	1	2	3	4	5
+5	−4	+1	−3	+7	**−30**	+10	**+20**	−3	**−24**	**+22**	+18	−3	+5	**−22**	−18

			VIII 403						IX 274					
6	7	8	1	2	3	4	5	6	1	2	3	4	5	6
+14	+13	−5	−15	−11	**+36**	−14	+1	+5	+16	**+43**	**−22**	−19	−16	−2

X 172					XI 108					XII 53				XIII 27		
1	2	3	4a	4b	1	2	3	4	5	1	2	3	4	1	2	3
+23	**+26**	−17	+1	**−32**	+6	+18	−2	−11	−10	−6	+13	**−23**	+14	+6	−18	+6

A test might be relatively easy or difficult for its age group and yet not vary enough from the others in its group to require shifting into another age group. The results in Table II are intended to help decide this question. In this table the Roman numerals refer again to the age groups. The Arabic numerals with the plus and minus signs following give the individual tests, the signs indicating whether they are relatively easy or difficult, according to the figures in Table I. The second horizontal column gives the mental ages of the children. The last horizontal column gives the number of children under each mental age and the percentage of this number that passed the test in question. Thus, in test III-1, 57 per cent. of the 129 children with a mental age of two passed test III-1; 98 per cent. of the 65 children with a mental age of three passed this test. The figures in the "black" type in this table indicate the tests which, according to these results, vary so much in relative ease or difficulty from the others in their

age group that they require shifting into another age group. These are nine in number, a few of which probably need a shift of more than a year.

TABLE II.

III 1+				VI 2−				VI 4+				VI 6−			
2		3		6		7		5		6		6		7	
N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
129	57	65	98	124	20	114	42	110	53	147	93	135	30	109	50

VI 7+				VII 4−				VIII 3+				IX 2+			
5		6		7		8		7		8		8		9	
N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
118	53	153	86	115	43	73	77	117	88	96	98	68	96	45	98

IX 3−				X 1+				X 2+				X 4b				XII 3−			
9		10		9		10		9		10		10		11		12		13	
N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
42	40	33	61	42	95	35	100	41	90	36	100	34	38	18	72	7	24	3	67

The results with the feeble-minded also offer opportunity to obtain evidence on the much-discussed question of the effect of age and training on the accuracy of the tests. It has been observed that the adult feeble-minded can do many more things than the younger normal child of the same intelligence, because the former has had so much more time to learn to do various things. Are the tasks the children are required to do in these tests affected in the same way? The data given in Table III indicate that the effect is not large enough to cause serious inaccuracy from this source. For this table the children are first classified into chronological age groups of 6 to 10 years, 11 to 15 years, etc., as shown in the first vertical column on the left. The remaining figures are obtained in the same way in this table as in Table I. Test III-1, for example, is easier than the average of the five tests in this age group for children chronologically 6 to 10 years old, as indicated by the + 15. It is easier still for children chronologically 11 to 15 years old, as indicated by the + 27, thus possibly showing some influence of age and training. A corresponding decrease in the figures preceded by the minus sign as the chronological age increases means, of course, the same thing. For those tests for which the figures could be at all interpreted as showing an influence of age and training the figures are put in "black" type again. The conclusion that this table leads to is that there seems to be some influence of age and training

for a number of the tests, but for nearly all of these it is hardly large enough to make the test too easy for its age group in the case of the older children unless it was already relatively easy for the younger children.

TABLE III.

	III					IV				V				VI	
Age	1	2	3	4	5	1	2	3	4	1	2	3	4	1	2
6-10	+15	−13	+3	+7	−11	+10	+19	−25	−4	+9	−10	+7	−6	+4	−30
11-15	+27	−12	0	−1	+4	+19	+12	−19	−14	+11	−5	+2	−8	+7	−31
16-25	+21	−15	−3	−6	+2	+10	+19	−17	−11	−3	0	+7	−2	+6	−34
16+	+22	−18	0	−6	+1	+8	+17	−3	−3	+4	−3	−3	0	+8	−27

	VI					VII								VIII	
Age	3	4	5	6	7	1	2	3	4	5	6	7	8	1	2
6-10	+6	+13	+3	−15	+18	+40	+2	0	−33	−25	+18	+19	−25	..	..
11-15	+10	+16	0	−19	+19	+20	−2	+11	−19	−27	+10	+12	−2	−24	−7
16-25	+10	+19	−3	−19	+19	+18	−2	+5	−19	−19	+11	+10	−5	−20	−12
26+	+12	+30	−3	−19	+19	+8	−5	−2	−26	−10	+19	+16	−4	−6	−16

	VIII				IX						X				
Age	3	4	5	6	1	2	3	4	5	6	1	2	3	4a	4b
11-15	+43	−14	−3	+3	+10	+37	−22	−16	−13	+11	+19	+28	−2	−3	−43
16-25	+36	−14	+3	+4	+17	+45	−19	−20	−21	−1	+13	+19	−25	+17	−23
26+	+26	−15	+3	+5	+18	+46	−24	−19	−11	−9	+29	+25	−24	+4	−32

B. Needed Revisions. My experience with the Binet-Simon tests has led me to about the same conclusions as regards needed revisions as have already been pointed out by others, but perhaps with a considerable difference as to the relative importance of these different revisions. I should place the more important ones in the following order:

a. The tests need first of all a more complete standardization as regards just how each test is to be given and how the children's responses are to be interpreted.

b. Several of the tests need to be shifted to other age groups or dropped entirely and new ones supplied in their places.

c. The scale should be extended at both ends; extended and supplemented with more exacting tests at the upper end, and extended downward at the lower end to include the smaller mental ages below three years.

d. The number of tests should be the same for each age group.

C. A Revised List. In my revision the chief endeavor has been to supply as complete as possible a standardization of the procedure in giving the tests and in interpreting the responses obtained. This cannot be summarized here. The extension and supplementing of the upper end of the scale is left for a future report. The changes made in regard to the other points mentioned may be seen in a general way from the following revised list of tests:

Age Three Months.

1. Carrying hand or object to mouth.
2. Reaction to sudden sounds.
3. Binocular coördination.
4. Turning eyes toward light in marginal field of vision.
5. Winking to an object threatening the eyes.

Age Six Months.

1. a. Balancing head. b. Sitting.
2. Turning the head toward source of a sound.
3. Opposing thumb in grasping.
4. Prolonged holding of objects placed in hand.
5. Reaching for seen objects.

Age One Year.

1. Sitting and standing.
2. Speech.
3. Imitation of movements.
4. Marking with a pencil.
5. Recognition of objects.

Age Two Years.

1. Pointing out objects in a picture.
2. Imitation of simple movements.
3. Obeying simple commands.
4. Copying a circle.
5. Removal of wrapping from food before eating.

Age Three Years.

1. Enumeration of objects in a picture.
2. Comprehension of simple words.
3. Giving the family name.
4. Repetition of a sentence of six syllables.
5. Repetition of two numerals.

Age Four Years.

1. Giving sex.
2. Naming familiar objects.
3. Repetition of three numerals.
4. Comparison of two lines.
5. Discrimination of forms.

Age Five Years.

1. Counting four pennies.
2. Copying a square.
3. Comparison of two weights.
4. Game of patience.
5. Repetition of a sentence of ten words.

Age Six Years.

1. Distinction between right and left.
2. Aesthetic comparison.
3. Definition according to use of object.
4. Execution of three simultaneous commands.
5. Distinction between morning and afternoon.

Age Seven Years.

1. Description of a picture.
2. Naming four common pieces of money.
3. Telling number of fingers.
4. Recognition of multilations in pictures.
5. Repetition of five numerals.

Age Eight Years.

1. Copying a diamond.
2. Naming the months of the year.
3. Counting the value of stamps.
4. Counting backwards from twenty to one.
5. Comparing two objects from memory.

Age Nine Years.

1. Naming nine pieces of money.
2. Giving the date.
3. Definition better than according to use.
4. Making change.
5. Arrangement of weights.

Age Ten Years.

1. Counting dots.
2. Comprehension of easy questions.
3. Drawing a design from memory.
4. Using three words in a sentence.
5. Form board puzzle.

Age Eleven Years.

1. Recognition of absurdity in absurd statements.
2. Giving sixty words in three minutes.
3. Giving definitions of abstract words.
4. Words to put in order to make a sentence.
5. Giving the numbers to the parts of a form.

Age Twelve Years.

1. Repetition of seven numerals.
2. Rhyming words.
3. Repetition of one sentence or more with twenty-four syllables in all.
4. Problems of diverse facts.
5. Resistance to suggestion.

Age Fifteen Years.

1. Drawing the folds and a cut in a twice-folded piece of paper.
2. Drawing the figure of two juxtaposed triangles.
3. Distinguishing between two abstract terms.
4. Passage to summarize from memory.
5. Telling time if the hands of the clock were interchanged.

THE SLEEP OF SCHOOL CHILDREN, ITS DISTRIBUTION ACCORDING TO AGE, AND ITS RELATION TO PHYSICAL AND MENTAL EFFICIENCY.

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PART III. THE CONDITIONS OF CHILDREN'S SLEEP.

The conditions of sleep may be roughly classified under two headings: (a) the external or environmental, and (b) the internal or individual. Under the former may be considered such matters as the following:

1. *Housing conditions.* Teachers are fairly familiar with the unsatisfactory housing common among the poorer districts of our larger cities where families of all sizes carry on a wretched and squalid existence in dismal tenements of two or three rooms. Few of us, however, appreciate how many children in well-to-do communities are furnished sleeping accommodations which are hardly less pitiably inadequate. There is probably no section of the country where crowding is less common than in our Western States; but of the 2692 children who entered into this investigation only 32 per cent. have a bedroom to themselves, while 16.4 per cent. share the sleeping-room with two other persons and 9 per cent. with three or more.

2. *Ventilation.* Too often the teacher in the better class school takes it for granted that all the world shares her respect for fresh air and the out-of-doors. So little does she know about the home conditions which surround her pupils during the eighteen or nineteen hours when they are not in her charge!

The following table reveals the bedroom ventilation of our 2692 pupils for the different years. The first column shows that the number sleeping practically without ventilation is much larger in the earlier years. Why this marked improvement in ventilation in the later years? We believe it is difficult to account for it, except on the theory that it is the direct result of hygiene instruction in the school.

TABLE IV.—*Ventilation of Bedrooms.*

Age.	No window open. Per cent.	One open. Per cent.	More than one open. Per cent.	Open-air. Per cent.
6	40.6	43.8	12.5	3.1
7	38	52.5	8	1.5
8	28.5	58.1	9.3	4.1
9	28.4	56.2	12.1	3.3
10	24.6	57.8	14.5	3.1
11	26	56.4	14.5	3.1
12	19.6	63.5	13.6	3.3
13	16.6	62	16.6	4.8
14	10.2	66.6	20.8	2.4
15	14	69	14.6	2.4
16	5.2	67.8	25	2
17	6.5	70.4	18.5	4.6
18	2.5	78	17	2.5

Any teacher who will go to the slight trouble necessary to make a *sleep survey* in her school will probably find enough not only to astonish her, but to give her some valuable suggestions for the teaching of practical hygiene. In this case it was found that 47 per cent. of those sleeping with no windows open were sharing the bedroom with at least two other persons!

Work. Early morning work disturbs the sleep of a large percentage of the school boys in the larger cities. Five per cent. of Ravenhill's boys rose regularly before 5 A. M. for various kinds of work. Of the six-year-old boys, 2 per cent. were engaged in gainful occupations out of school hours. This rose to 28 per cent. at eleven years and to 53 per cent. at twelve.[1]

[1]In our own study the returns on this point were unreliable because of the unfortunate wording of one of the questions. The expression, "hours per week," was evidently overlooked by many of the children, who answered in terms of "hours per day" instead. For the same reason our data on amount of home study proved worthless.

Almost any teacher in city schools above the sixth grade will find, if she takes the trouble to inquire, a certain number of pupils in her class who are engaged in productive labor from 10 to twenty hours per week.

Hours of retiring. Many children secure insufficient sleep merely because they are not put to bed early enough. Nearly 5 per cent. of Ravenhill's six-year-old children retire as late as 10 o'clock, and nearly 10 per cent. of her ten-year-olds. The time lost in this way cannot be fully made up in the morning because of the disturbance caused by the early rising of parents and because of the necessity of getting to school at a given hour. In other words, the hours set apart for the sleep of children are not those best adapted to insure a sufficient amount. Even the families who set a reasonably early hour for the children to retire usually permit so many irregularities that, as one writer puts it, "the law is more observed in the breach than in the performance." Ravenhill found that 20 per cent. at six years and 40 per cent. at thirteen years were allowed one or more irregularities per week. The European custom of beginning school at 7 to 8 o'clock in the morning works great hardship, often causing the pupil to rush away to school in nervous haste and without breakfast. The American practice of beginning at 9 o'clock is far wiser, and should never be changed unless for very special reasons.

Vermin. Medical examiners not infrequently find from 10 to 40 per cent. of the pupils of a school afflicted with vermin. Needless to say, the child who is so tormented cannot secure normal sleep. The reflex nervous irritation produced by vermin disturbs the nutritive functions not only directly, but also indirectly, through its interference with sleep, and teachers need not be surprised when extreme malnutrition and nervousness result from a cause apparently so trivial. Other parasitic diseases, such as scabies, ringworm and intestinal worms, should be mentioned in this connection.

Miscellaneous conditions. The sleep of school children is influenced in many other ways. Temperatures much above 60 degrees are unfavorable either to quantity or quality; and largely for this reason children sleep more in winter than in summer. The late sunrise of winter mornings exerts an in-

fluence in the same direction. Our reflexes are habituated to such delicate response to the stimulus of light that for many of us even a gleam of moonlight through the window disturbs our rest. Humidity and atmospheric pressure are other factors, though their exact effects have not yet been determined.[2]

Other children sleep poorly for lack of a bed and because of inadequate protection from cold. Still others are aroused by the din of early street noises.

Internal Conditions Influencing Sleep.

Improper diet is one of the most important of these. The child's sleep may be disturbed by excess of starchy foods, unsuitable cooking, etc. The late dinner, following an inadequate breakfast and a cold, unsatisfying noon-day meal, favors engorgement of the stomach through excess of hunger, and is also unfavorable to sleep.

The influence of tea and coffee upon sleep is a matter of common observation. The experiments of Hollingsworth (18) on ten men and six women, extending over a period of forty days, verify common opinion on this point, and show that the influence of caffeine is in inverse proportion to the weight of the subject. One cup of coffee for the seven-year-old child is therefore equivalent to three cups for the average adult. Even this may understate the facts, since it is probable that the child's body does not adjust and become habituated to the evil effects of drugs as well as the body of the adult, even in proportion to its size.[3] It is not overstating the facts to say that many hundreds of thousands of school children in the United States are kept in a constant state of semi-intoxication by the use of coffee and tea. The total effect upon sleep and health can only be surmised.

[2]For conflicting evidence on this point see the study of Dr. Caroline Osborne (28).

[3]It is much to be regretted that our own investigation did not undertake to secure data on the relation of sleep to the consumption of coffee and tea. The prevalence of this species of drug habit among school children has, however, been ascertained by Dr. Hoag for the California cities of Pasadena, Berkeley and San Luis Obispo. He finds that the proportion consuming one cup or more per day falls usually between 40 and 75 per cent. for children in the best schools. Occasionally the young child drinks from three to six cups of strong coffee daily.

Other familiar sources of disturbed sleep are obstructed breathing, eye-strain, dentition, earache, toothache, etc.

The nervous child is notoriously a bad sleeper. Such a child is likely to be obsessed by fears, tormented by absurd pangs of conscience, excited by an over-active intelligence, or worried by trivial happenings which would be forgotten by the normal child in a few minutes. Religion-bred fears, fear of the dark and vague indefinable anxieties haunt the evening hours of more children than most of us suspect, for children learn that it is pleasanter to bear many a secret pain and sorrow than to hazard reproof and misunderstanding by imparting them to unsympathetic elders.

One nervous girl of nine years, a stutterer and subject to many fears, is not able to go to sleep if she recalls after retiring that she has forgotten to say good-night to some member of the family. A boy of seven, with an over-active imagination, after going to bed rehearses for hours his play and story experiences of the day. Another cannot find the bed comfortable, and calls his parents a dozen times to tuck him in. If they do not come, he cries and moans. An adolescent girl was for years kept awake at night by fear of death and hell. The fear did not leave her during sleep, but disturbed her dreams and caused her often to wake with a sudden start to realize again with renewed horror the awful doom inevitably awaiting her.

Home study nearly always robs the nervous child of the margin of sleep he so much needs. It not only causes him to remain up later, but is likely to induce an excited condition of mind, which is followed by superficial and disturbed sleep. Arithmetic lessons are especially unsuited for home assignments, but because of their quality of definiteness are just the kind of home work with which children are most likely to be burdened.

Night terrors. In children from six to ten years of age night terrors are a common disturbance. They are occasionally provoked by indigestion, obstructed breathing or other reflex irritations, but in most cases of chronic recurrence are associated with other heriditary nervous taints, notably migraine. They are often present in chorea. The condition is symptomatic

of general nervous instability. *The child who suffers often from night terrors deserves special oversight on the part of parent, teacher and physician.* Often it is wise to remove such a child from school.

In a study of a precocious and talented boy, one of the writers has uncovered an extreme case of prolonged suffering from night terrors. The following clinical description will no doubt add to the reader's interest in the case:

> Age when study was made, 14 years. Mother, who was 46 years old at his birth, a woman of remarkable intelligence and decided literary ability. Father, though a ne'er-do-well, was from one of the best families of England. The son, a musical prodigy at 6 years, attacked by chorea at 7 years; since which period he has suffered from tics and automatisms. Because of his nervousness, has not attended school since age of 7. Taught by his mother and has excellent literary taste. He constantly improvises music, and shows remarkable ability and interest in botany. He is independent of thought, oldish, and very talented, but neurotic and "queer."

From the age of eight to about twelve this boy suffered the most horrible night terrors imaginable, for two years almost nightly. These involved drowning, falling from cliffs and steeples, being shot, mangled, seeing himself lying dead, crossing frail bridges over bottomless chasms, being placed in hell, undergoing countless forms of torture, etc. Sometimes in his dreams a crowd of people would poke at him with red-hot irons. Sometimes he walked through dark and gloomy places, when horrible faces would suddenly appear. The most terrifying dream of all, though the subject does not understand why it should have been so, was one in which he found himself looking down into a deep well, which grew deeper and deeper the longer he looked, until, with a scream of terror, he would awaken. Some of his nightmares belonged to the class of "continued" dreams. One of these lasted nearly a month. It began in a bleak, cold house in which the subject thought himself starving and dying of thirst. After what seemed an interminably long time one drop of water and one crumb of bread would appear. These were ravenously consumed, and then after another small eternity another drop and crumb came to tantalize him.[4] The following night he found himself

[4]The boy and mother had some months previously remained without money or friends in the city of New York *in a half-starved condition.* The boy fully expected at the time to die of starvation. He has always lived in grinding poverty, eating his bread without butter and often going without meals altogether.

in the same house, but other persons were with him. Gradually these changed their human shapes. More and more joined the throng, each newcomer more horrible, mis-shapen and gorilla-like than the others. The next night these monsters began an endless series of tortures, biting off his nose, poking at his eyes, starving him, etc. This continued with variations for many nights, each dream ending with cries and waking. Finally the monsters began to die, each with nerve-racking screeching and groaning. But for each one that died one or two others appeared, still more horrible. The continued dream ended in death from starvation.

This boy insists that he *has never had a pleasant dream.* All his dreams have been nightmares. At the age of twelve years he made a determined effort to free himself from these *by willing not to have them.* No one suggested this. Immediately they became less frequent, and finally ceased almost altogether.

We have in the above case a peculiar combination of neurotic constitution, rheumatic diathesis and unfortunate mental and physical influences. Not many children have suffered from night terrors as this boy has, but many nervous children are afflicted to a less degree. To condemn such children to the sedentary life of the school or to burden them with school tasks or over-strenuous musical training is a mistake.

It is not yet clear to what extent the Freudian method of psycho-analysis displays the true mechanism of such dreams, or how successfully the method may be applied in the therapeutic treatment of stubborn cases.

It may be added that children of school age are seldom affected with protracted *insomnia.*

Teaching Children to Sleep.

Teachers do not control the homes of today, but they are implanting the ideals which will condition the homes of to-

morrow. That only 3.1 per cent. of the school children in the mild and equable climate of California enjoy open-air sleeping-rooms suggests what remains to be done in this line of instruction.

The teacher should know the poor sleepers in her classes and those who suffer night terrors or other fears and obsessions which interfere with sleep. She should know which children drink coffee, tea and beer; which ones sleep in crowded and ill-ventilated bedrooms. Facts demonstrate that a large proportion of the homes stand in need of expert advice in these and kindred matters. Here, as elsewhere, poverty and ignorance take their greatest toll out of the lives of little children.

The presence of the physician in the school should not arouse a mistaken sense of assurance that all will now be well as regards the physical needs of the child, and that the teacher can safely turn over every responsibility of this kind to the medical examiner. The latter usually has several thousands of children under his charge, and cannot pay heed to all the conditions which concern the individual child. As already suggested, the teacher should make a health survey of her pupils, and should strive to do what she can to improve the conditions which she finds to exist.

Sleep ranks with food as one of the most imperative needs of the human organism, and like the latter it has its educational and economical aspects as well as its physiological and biological. But while diet has long received a liberal share of attention from economist, hygienist and biologist, the scientific study of the hygiene of sleep has been hardly more than initiated. We seem to have rested content in the supposition that sleep of satisfactory quantity and quality can always be had when needed. Theoretically, and under natural conditions, this may be true. Under the unnatural conditions of modern life it is not true. In this respect the problem is analogous to that of ventilation. The ocean of fresh air is always at hand, but the problems of the ventilating engineer are none the less real.

APPENDIX.

The Sleep of the Feeble-minded.[5]

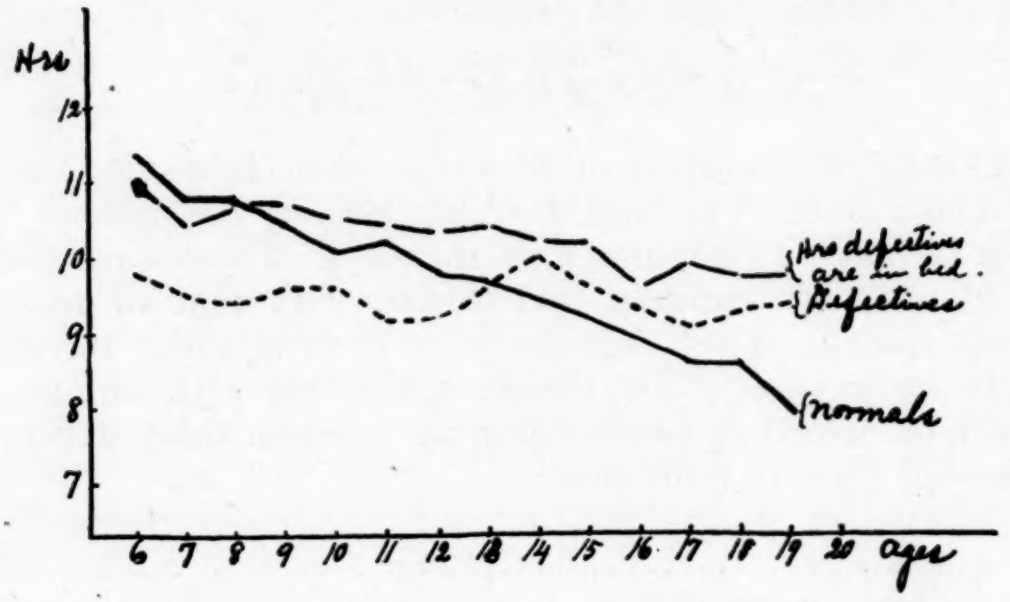
Through the courtesy of Superintendent Johnstone and Dr. Goddard of the Vineland Training School, the authors were able to make a comparison of the sleep of feeble-minded individuals, both children and adults, with that of normals. Sleep records of 383 inmates were secured under the immediate supervision of Dr. Goddard, together with supplementary data, according to the following question sheet, which was filled out for each individual:

(1) Sex .....Age .....
(2) Grade of mentality.....
(3) Type of defective.....
(4) Regular hour of going to bed.....
(5) Regular hour of getting up.....
(6) At what hour does patient usually go to sleep? (Give an actual record if possible).....
(7) At what hour does patient usually awaken? (Give actual record for same night as above if possible).....
(8) Is sleep usually *unbroken, somewhat broken,* or *very much broken?* .....
(9) Disposition of patient:—quiet, irritable, good-natured, self-controlled, violent, fits of temper, moody, anxious, nervous, lacks self-control, lacks energy.....
(10) Conditions of health.....Physical defects.....

RESULTS.

(a) *The sleep of mentally defective children, according to chronological age.* The following chart shows the average hours of sleep for the 193 of our defectives (sexes taken together) whose ages lay between six and nineteen years. For sake of comparison, the curve for our normals is produced, also a curve showing the average number of hours by *chronological ages* our defectives are allowed in bed.

[5]The writers are greatly indebted to Dr. Goddard and Superintendent Johnstone for their interest and co-operation in the study.

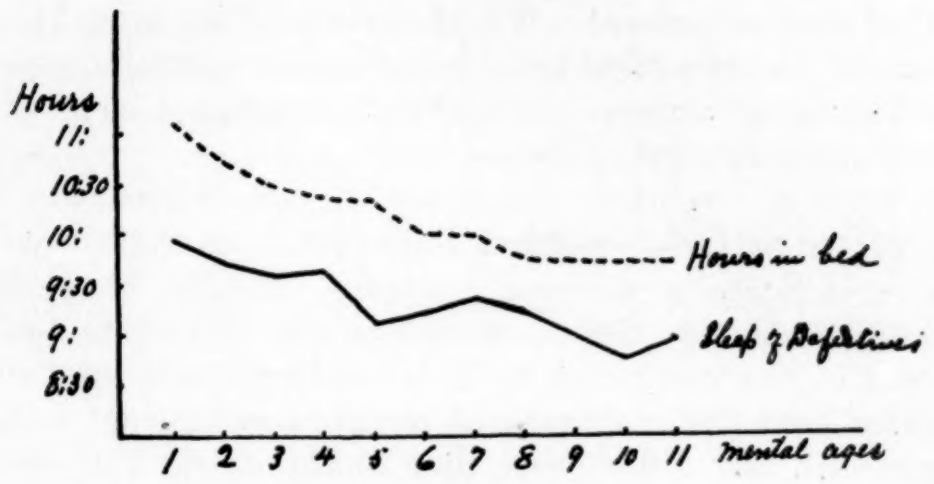


The interesting thing about the above curve is that *age differences are practically non-existent with the defectives.* The only marked rise in the curve comes at fourteen years, the sleep of children six to twelve running slightly lower than that for the ages sixteen to nineteen. If the curve for defectives had been prolonged to include the ages above nineteen years, it would be found practically horizontal from twenty to forty, with marked but gradual rise thereafter to sixty and above. The averages by decades are as follows:

	Number.	Sleep in hours and minutes.
Ages 21-30	137	9.05
Ages 31-40	39	9.06
Ages 41-50	11	9.26
Ages 51 and upwards	3	10.

Our data, however, for the years six (two cases), seven (three cases) and above fifty (three cases) are too scanty to be reliable.

(b) *The relation of sleep to degree of mental deficiency.* This is shown in the following chart, together with another curve indicating the average number of hours spent *in bed* by the feeble-minded individuals of various *mental ages.*



Again it is seen that the amount of sleep bears little relation to intelligence, and the conclusion arrived at in Part II of the study of normal children is borne out. To test the matter further the hours of sleep of the defectives of each chronological age were tabulated separately for each "mental age." The results showed only very slight differences for chronological age, whatever the degree of mental defect, and such differences as were found are possibly due to the fact that the lowest grade defectives are allowed, on the average, a little more time in bed than are the higher grade defectives (see chart).

Low grade defectives, whatever their chronological age, sleep much less than normal children of the *same mental age*, while high grade mental defectives sleep as much as normals of the same mental age, or even more. Thus practically all our sixteen-year-old feeble-minded children whose mental ages fall between two and six years, inclusive, sleep the same number of hours, namely, nine and a half. Although the younger feeble-minded are allowed much more time in bed than are the older, their period of sleep is but little different.

In trying to understand the feeble-minded individual child from the biological and genetic point of view, the question of correlation or non-correlation of the sleep requirements to degree of mental retardation is extremely interesting. It is unnecessary to add that our own scanty data, vitiated as they are by the regimen of institutional life, do not pretend to give any final answer to this question, still less to explain any rela-

tion that may be present. Whether sleep be explained in terms of instinct, chemical and toxic influences or neural metabolism, the influence of extreme mental defect upon it is of interest both theoretically and practically.

(c) Does the relative smallness of age differences in the sleep of these feeble-minded individuals as compared with normals indicate a *genuine contrast between normals and feeble-minded,* or is the phenomenon due merely to the daily program of the institution? It is evident from data already presented that the institutional program would act to *reduce* any genuine age differences that might exist, but since the hours in bed are regulated *in part* according to chronological age, we should hardly expect the age differences in sleep to be so completely obliterated. The fact of obliteration would itself indicate the extreme plasticity of the sleep habits.

This point, however, can only be settled by the collection of sleep records from children who do not lead an institutional life, and the writers would be glad to secure the co-operation of teachers of public school *special classes* in the collection of data on the subject. Correspondence with this end in view is invited.

(d) *Sex differences* of importance do not appear in our sleep records of the feeble-minded.

(e) For each age the *variability among the feeble-minded* as regards hours of sleep is much less than for the normals. This may be wholly the result of institutional life.

(f) Among the feeble-minded, as among normals, no relation appears between *hours of sleep and the number of "nervous traits."*

(g) In *quality of sleep* the feeble-minded of each grade of mentality compare favorably with normal children. The figures for all grades taken together show that the sleep of 89 per cent. is "practically unbroken;" that of 8.4 per cent. "somewhat broken," and that of 2.6 per cent. "very much broken."

In conclusion, it may be said that unsatisfactory as are our data on the feeble-minded, they indicate in an interesting way the comparative lack of dependence of mental efficiency upon hours of sleep. Our feeble-minded children, whatever the

grade of defect, sleep much *less* than normal children of the same age, the feeble-minded adults much *more* than normal adults. As regards sleep, the feeble-minded seem to retain throughout life the characteristics of childhood.

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AN ANALYSIS OF THE MIRROR DRAWING EXPERIMENT.

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SUMMARY.

1. The analysis of the mirror-test presents distinctive learning types. Some subjects gain control of the situation by a fairly regular procedure, others temporarily lose control at some point in the series. The majority of the latter lose control at the fourth or fifth trial in a series of six tests in the mirror drawing.

2. This examination further indicates that, where the time of each individual series is referred to the total time curve, fast, slow, and irregular are fairly fundamental distinctions.

3. Finally, an accurate knowledge of the learning process, must, in the last analysis, be based on individual and small group curves.

Professor Starch, in an article in the Psychological Bulletin (2), presents a method of demonstrating the trial and error learning process, and gives a learning curve. Professor Dearborn, whose arrangement of apparatus was used by Starch, discussed the individual variations of the learning process in this and other methods of experimentation at the Minneapolis meeting of the American Psychological Association in 1910. One of the writers, while listening to this paper, recalled that the result of a mirror test then in progress for another purpose showed details similar to these. The experiment[1] was a series of correlations of four general intelligence tests and the college grades of a number of freshmen in the University, one

[1]For a full account of the experiment see this JOURNAL, Vol. IV, No. 4, April, 1913, p. 223.

of the tests used being the mirror-drawing test. A further study of the time records from this test led the writers to believe that there might result something of profit from the examination of this test by itself. The results of this examination are reported here.

The records studied are those made by thirty elementary school boys and one hundred and three college freshmen. Fifty-two of the latter are girls and fifty-one are boys. The apparatus and its arrangement are figured in Whipple (3, p. 345). The pattern used differs somewhat from those previously described. Six sheets were prepared for each experiment, as follows: The circumference and center of a circle 16 cm. in diameter were drawn on ordinary paper, and twelve equi-distant points were indicated on the circumference. This paper was laid over the six sheets, the center and these twelve points on the circumference were marked by pin holes through the paper, and the pin holes on each sheet were designated by the digits from '0' to '12' in mirror handwriting. The digits were placed in irregular order, with the exception of 0, which always marked the center. The arrangement of digits differed on each of the six sheets, but the sheets for the separate trials came in the same order for all of the subjects.

Such an arrangement eliminates practically all automatic drawing, and demands care and attention throughout the series of six trials that constitute a single experiment. It also makes the time for an experiment longer and changes its character somewhat, for each digit must be 'hunted for' at each trial. The memory process is limited largely to the recall of the method of drawing by the reverse movement of mirror writing.

None of the subjects knew how many trials would be allowed, but all were urged to make each trial better and faster than the last. We are aware that a discussion of results on a time basis alone is only a partial report, but no adequate means of measuring accuracy has as yet been devised.

TABLE I.—*Medians, Averages, Etc.*

	Trial.	1st.	2d.	3d.	4th.	5th.	6th.	Av.
1. Slowest.	Total. . . .	752	337.5	303.5	175	201.75	171	242.37
	Girls. . . .	700.5	337.5	303.5	153.5	201.75	171	242.37
	Boys	752	277	270	175	121	105	193.33
	Elem. . . .	517	245	205	180	158	113	210
2. Fastest.	Total. . . .	31.5	23.5	19.25	18.25	17.75	17	21.95
	Girls. . . .	31.5	23.5	19.25	18.25	17.75	17	23.95
	Boys	72	49	40	34	33	23	46.87
	Elem. . . .	69	51	41	43	40	32	53.66
3. Medians.	Total. . . .	127.5	90	59	52	47	39.5	75.2
	Girls. . . .	92	65	48	41	35	28	54.7
	Boys	167.5	105	80	68	56	48	97.83
	Elem. . . .	243	121	93	82	68	50	110.33
4. Averages.	Total. . . .	169.11	99.15	71.41	59.68	54.41	42.23	82.55
	Girls. . . .	121.06	81.37	55.70	46.95	46.30	34.5	64.41
	Boys	218.10	117.27	87.42	72.67	62.67	50.12	101.06
	Elem. . . .	236.5	128.5	98.6	93.1	77.5	55.5	115.09
5. M. V.'s.	Total. . . .	93.98	41.89	30.22	22.91	18.99	15.58	33.54
	Girls. . . .	64.09	33.93	26.63	19.31	21.96	14.21	27.4
	Boys	104.21	39.33	30.31	19.66	19.86	13.49	33.38
	Elem. . . .	94.9	45.5	28.1	34.7	24.7	17.1	36.57

LEGEND.—'1' of the table shows the slowest time made in each of the six trials, by boys and girls taken together, by each sex separately, and by the elementary boys. '2,' '3,' '4,' and '5' follow this arrangement under their different rubrics. 'Av.' at the head of the eighth column gives the average of the six tests as shown in each line of figures of the table.

These curves correspond to the usual learning curve, human or animal, where the 'ironing-out' process of increasing the number of individual curves used is applied. It is in the high mean variations and lines marked 'fastest' and 'slowest' that large individual variations are first noted. But even here there is practically no intimation of the complexity and variability shown in the following tables.

The sex difference in rate discussed in a previous paper is in evidence. The elementary boys are slower than either group of the freshmen. In two of the trials, the first and third, their M.V.'s are better than those of the freshmen boys.

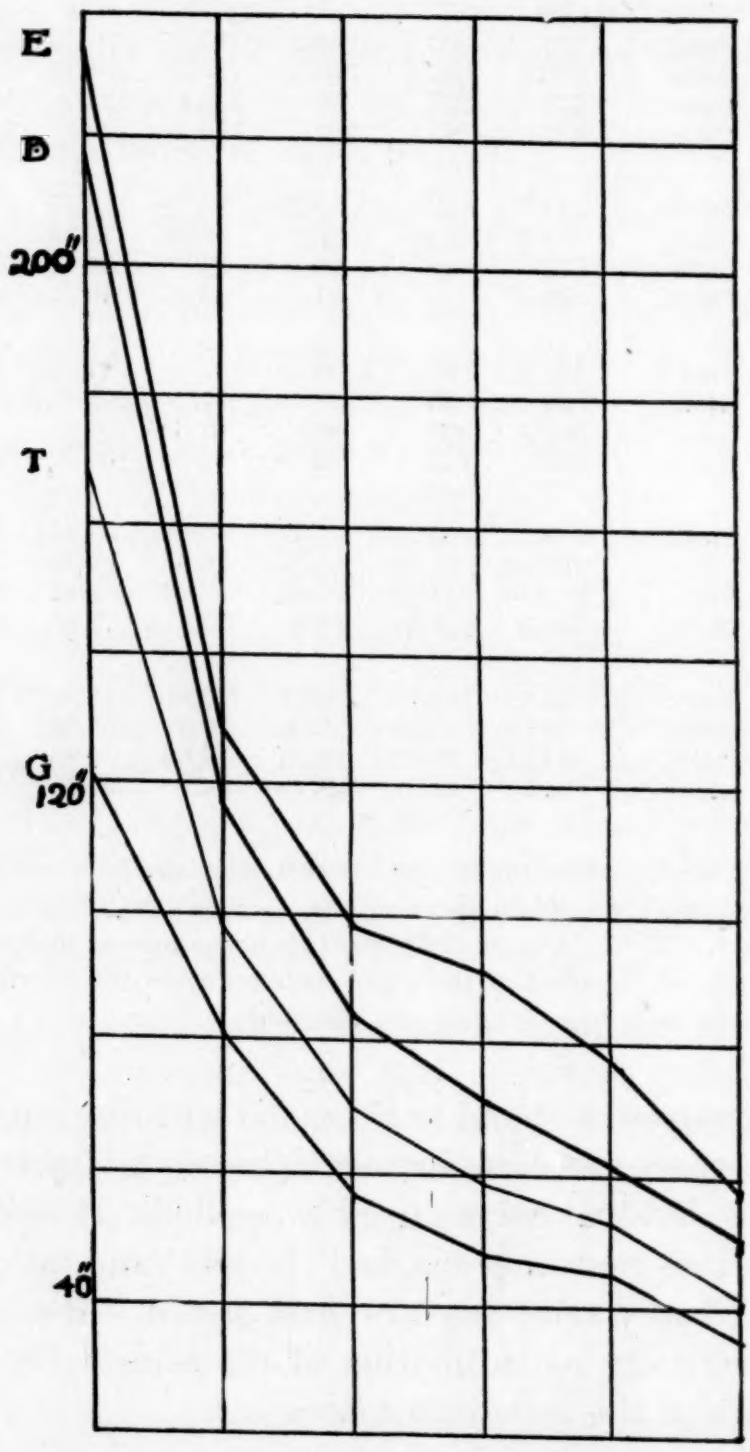


PLATE I. "E" represents the average time for the elementary boys, "B" the freshmen boys, "G" the freshmen girls, and "T" shows the average time for the total number (103) of college freshmen.

TABLE II.—*Table of Frequencies in Mirror Drawing.*

Trial.	Total Freshmen.						Boys.						Girls.						Average.		
" "	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	T.	B.	G.
11—20	..	..	1	2	4	12	..	..	..	..	..	..	..	..	1	2	4	12	..	..	..
21—30	..	4	10	11	16	24	..	..	..	..	..	5	..	4	10	11	16	19	5	..	5
40	2	8	11	12	22	17	..	..	2	1	10	12	2	8	9	11	12	5	11	2	11
50	5	4	13	25	15	24	..	1	4	13	8	14	5	3	9	12	7	10	5	3	3
60	5	7	19	14	16	12	..	2	10	9	12	8	5	5	10	5	4	4	17	9	14
70	8	16	11	6	15	4	..	6	7	5	4	4	8	10	4	2	1	0	10	5	1
80	1	7	7	14	10	7	1	5	3	9	6	6	0	1	3	5	4	1	0	4	4
90	8	7	7	4	2	1	3	3	6	2	2	1	5	4	1	2	0	..	9	3	5
100	5	9	7	3	6	0	1	6	5	3	5	0	4	5	2	0	1	..	7	8	4
10	7	6	3	4	2	1	4	3	3	3	2	1	3	2	2	1	0	..	8	3	0
20	5	6	3	3	2	..	2	4	2	3	1	..	3	2	0	..	1	..	4	2	1
30	7	6	4	1	1	1	4	5	3	1	1	..	3	1	1	..	..	..	2	1	0
40	4	5	1	0	0	..	2	3	1	0	..	..	2	2	1	..	..	..	3	3	2
50	8	4	1	0	0	..	5	4	1	0	..	..	3	0	..	..	..	..	3	3	0
60	2	1	2	2	0	..	1	1	2	1	..	..	1	0	..	1	..	..	4	3	1
70	5	3	0	0	1	..	4	1	0	0	..	..	1	2	..	..	1	..	3	1	..
80	3	3	1	1	0	1	3	1	1	1	..	..	0	2	..	..	..	1	1	0	..
90	1	0	..	..	0	..	0	0	..	..	..	..	1	..	..	..	..	..	0	1	..
200	1	1	..	..	0	..	1	1	..	..	..	..	0	..	..	..	..	..	1	..	..
10	1	0	..	..	1	..	1	0	..	..	..	..	0	..	..	..	1	..	..	..	..
20	3	1	..	..	..	..	3	1	..	..	..	..	0	..	..	..	..	..	..	..	..
30	1	0	..	..	..	..	0	0	..	..	..	..	1	..	..	..	..	..	..	..	..
40	0	2	..	..	..	..	0	2	..	..	..	..	0	..	..	..	..	..	..	..	..
50	1	1	..	..	..	..	1	1	..	..	..	..	1	..	..	..	..	..	1	..	1
60	2	0	..	..	..	..	1	0	..	..	..	..	0	..	..	..	..	..	..	..	..
70	2	0	..	..	..	..	1	0	..	..	..	..	1	..	..	..	..	..	..	..	..
80	0	1	..	..	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..	..
290	1/15	0/1	..	..	..	..	1/12						/3	/1	/1						

LEGEND.—/15, etc., at the bottom of the table indicate cases that fall beyond the '290' limit of the table. The portion of the table headed 'Average' gives the distribution of the average of the six trials for all the freshmen and for the boys and girls separately.

The first four trials give no real distribution curve, so great is the individual variation. The fifth and sixth give good distribution areas on several unit bases. If we separate the sexes, a satisfactory distribution curve appears in the fourth trial. This shows that the modes for the two sexes are different. These individual and sex variations are so great that the distribution curve of the total averages falls into three fairly distinct modes. With all the great variations of the first four trials, and with the small numbers of individuals used, the sixth trial shows that the mode and curve of the test itself is finally regular. The curve of distribution for boys is slightly more regular than the one for girls. To repeat, the time consumed in the first trial is an individual variation; that of the last more nearly represents the individual's place in the group. In the first and sixth trials we really have two measurements of a single individual.

A ranking sheet for these six trials was prepared and correlations were figured from the rankings in order to estimate how nearly each individual tended to maintain his rank of the first trial in each succeeding trial. The coefficients of correlation of each trial after the first, with the first, are as follows: .79, .76, .74, .64, .59. Correlating the first trial with the average of the six gives a coefficient of .93. The results here correspond well with the analysis just made above. Learning curves are individualistic, and tend to become less so as the external difficulties wear off. The massing of individual curves into a single curve obscures this fact.

Two hundred and thirteen, the average number of seconds for G.R. in the first trial, is the base for all curves shown here. It is taken equal to 10, and the corresponding numbers for the other times were obtained by using a slide rule. The digits by each curve show the number of subjects whose averages are represented in the curve. The middle curve represents the total of each group. The upper is always for the boys of that group.

The following table is an attempt to show certain of these variations hidden in the general curves described above:

TABLE III.—103 *College Freshmen.*

Group.	1st.	2d.	3d.	4th.	5th.	6th.	Equal.	No. in preceding lines.	In subsequent lines.	Here only.	Total.
G. R.....	213	109	78	58	49	38	..	..	..	31	31
2 > 1....	146	181	101	78	80	58	..	..	5	4	9
3 >> 2....	170	67	95	68	48	40	1	..	6	3	9
4 >> 3....	158	85	59	69	59	43	1	3	12	17	32
5 >> 4....	138	94	68	55	65	45	7	15	3	18	36
6 > 5....	112	71	48	41	34	37	2	6	..	5	11
					52 *Girls.*						
G. R.....	144	63	40	34	25	21	..	..	..	9	9
2 > 1....	139	177	105	74	85	57	..	..	3	3	6
3 >> 2....	123	54	82	54	42	23	..	..	5	1	6
4 >> 3....	105	67	46	57	50	32	1	2	8	7	17
5 >> 4....	129	90	56	45	60	41	6	10	3	12	25
6 > 5....	85	62	43	37	32	35	2	6	..	2	8
					51 *Boys.*						
G. R.....	241	129	102	67	57	45	..	..	..	22	22
2 > 1....	160	223	100	87	70	59	..	..	1	2	3
3 >> 2....	296	93	155	96	60	55	1	..	1	2	3
4 >> 3....	217	107	75	84	70	55	..	1	4	10	15
5 >> 4....	156	107	71	64	75	54	1	5	1	6	11
6 > 5....	185	97	64	52	38	44	..	..	..	3	3
					30 *Elementary Boys.*						
G. R.....	279	148	103	88	64	51	..	..	..	8	8
2 > 1....	71	79	71	52	51	46	..	..	2	..	2
3 >> 2....	190	102	117	82	76	58	1	1	4	3	8
4 >> 3....	243	120	85	114	84	54	..	2	4	5	11
5 >> 4....	213	121	92	79	89	60	..	6	1	3	10
6 > 5....	314	184	159	100	100	109	..	2	..	..	2

LEGEND.—Numbers in columns headed 1st, etc., are the averages of the individual records falling in that group and trial; *e. g.*, 'G. R.,' etc., together with the number in the column headed 'Total,' reads '21 individuals gradually reduced their time through the six trials;' line 2 reads '9 individuals made a slower record in the second trials than in the first,' etc. The column headed 'Equal' shows those counted in the group, but who, in reality, made the trial in the time of their preceding trial. The last five columns, then, deal with a further distribution of individuals.

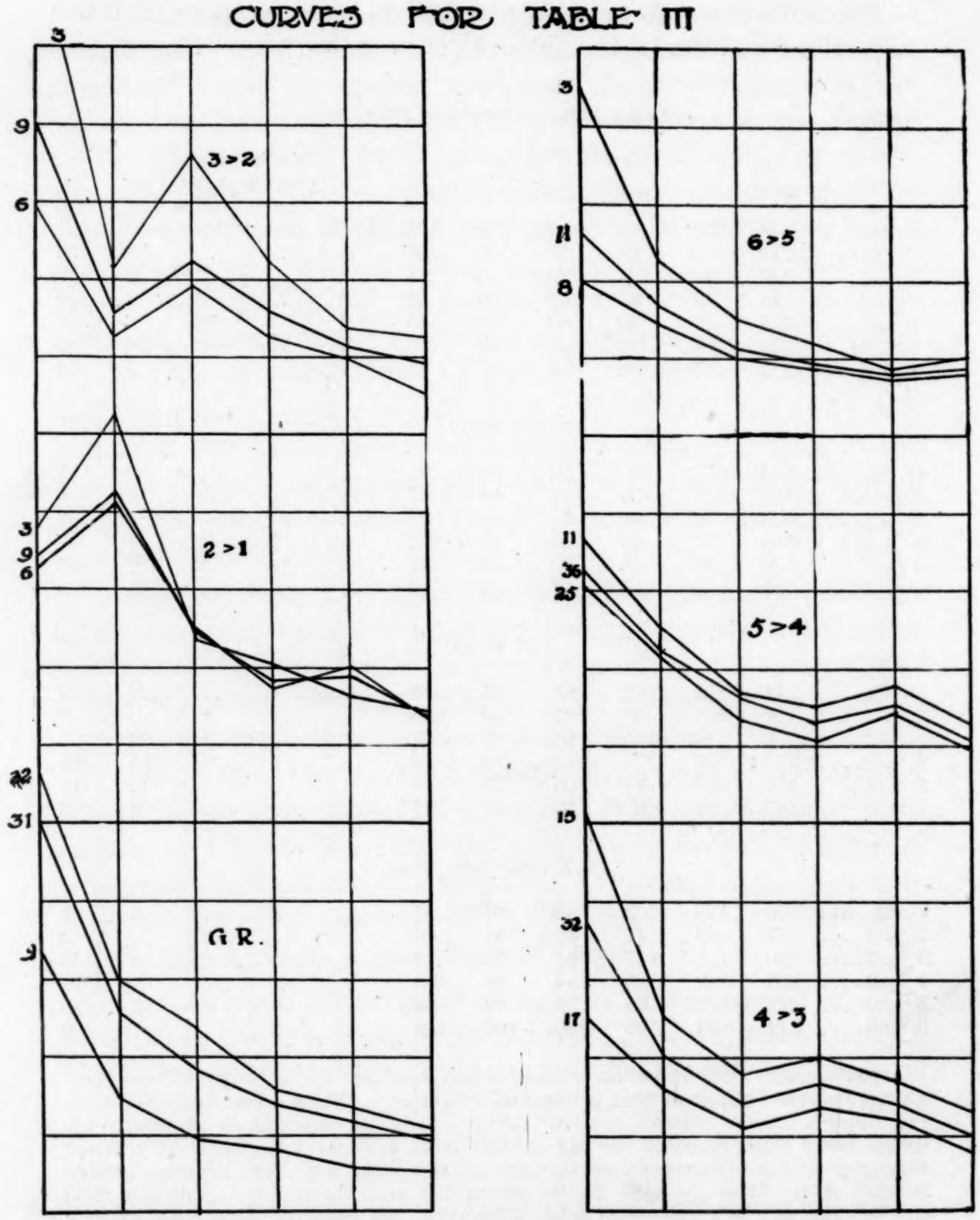


PLATE II. The curves show the average of the individual records falling in a given group and trial. The digits to the left of each curve show the number of individuals included in the group. The upper curve of each set represents the boys, the lower the girls, and the middle the total. "G.R." represents the records of those who gradually reduced their time through the six trials. "2>1" gives the records of those whose time on the second trial was greater than on the first. "3>2" indicates the showing of those who took longer on the third trial than on the second, etc.

With the exception of line 2 > 1 (2 is greater than 1) where two places of difficulty occur for the girls, their records are always lower than the corresponding trials in the boys' records. Notwithstanding this superiority in absolute speed, they give the same variation as the boys from trial to trial.

A greater proportion of boys than of girls appears in the 'gradual reduction' group. In all groups, including the elementary boys, trials four or five increase the number of individuals who fail to maintain their previous rate of work. These trials seem to suffer from a temporary difficulty of some sort. More individuals who have irregularities in other trials belong to this group; this is indicated by Columns 8 and 9 of the table. More caution is exhibited by the boys in approaching the experiment. Relatively few of them, 21 per cent., make more than one decrease in rate, while 52 per cent., approximately, of the girls are found in other rate-decreasing groups, or trials. About 53 per cent. of the elementary boys make more than one decrease in the rising practice curve. In other words, the girls and elementary boys lose control much more frequently than the boys.

We may have either six or three groups represented by these curves. G.R. and 6 > 5 constitute a division that is fairly consistent in practice gains; 2 > 1, 3 > 2 and 4 > 3 are distinctly irregular; 5 > 4 suggests a group of individuals who are at the first plateau in their increase in rapidity.

TABLE IV.—*Distribution of Subjects with Respect to the Different Medians.*

General Median.

	Total.	Above.	Below.	Shift above.	Shift below.	Irregular.
Boys	51	3	24	12	12	..
Girls	52	26	6	9	11	...

Separate Medians.

Boys	51	15	12	8	6	10
Girls	52	15	15	2	5	15
Elem.	30	8	9	3	4	6

LEGEND.—This table indicates the number of subjects who made records faster or slower, or became faster or slower, or shifted both above and below the different medians. The medians used are shown in Table I. The first division here is based on the general median for college freshmen irrespective of sex. The others follow as in Table I; *e. g.*, 'Above' means these remained above the median.

Table IV again points to specific variations in the learning process. As indicated by this table, some are slow, others fast, and still others irregular in three possible ways. A few of these irregular ones gain a better position, others lose their early advantage, and still others are simply irregular.

Certain permanent differences will be found among the individuals who attempt to revise well-established co-ordinations and make new ones. Averages of and curves drawn from the totals of any one of these groups will often barely indicate these variations. The general features of all the learning curves are similar. It is in the comparison of the individual curve and of the small group curve, with the curve of the total, that these differences appear.

REFERENCES.

1. Downey, J. *Control processes in modified handwriting; an experimental study.* Psychol. Rev. Mon. Supp., V. 9, No. 37.
2. Starch, D. *A demonstration of the trial and error method of learning.* Psychol. Bull., V. 7, pp. 20-23.
3. Whipple, G. M. *Manual of Mental and Physical Tests.* Baltimore, 1910, pp. 343-350.

COMMUNICATIONS AND DISCUSSIONS.

A NEW FORM OF THE SUBSTITUTION TEST.

The purpose of this communication is to call attention to a form of the substitution test which may be used for testing a higher type of learning than that involved in most forms already adopted.

Several different tests, all of which may be classed under the general head of substitution tests, have been published. Dearborn[1] and Starch[2] have used two different forms. The first is one in which a number is to be substituted for each letter in the alphabet as 25 for "a," 7 for "b," etc. The key is placed at the top of the page, the material to be written is printed in short lines down the left hand side of the page, and the substitutions are to be made in blank squares to the right of each printed line. The second test is one in which a character is to be substituted for each of the digits as X for 8, = for 9, etc. The same general form for the page upon which the test appears is used as before, and the test consists in writing certain numbers by making the substitutions suggested above.

Whipple[3] suggests two variations of the second form, but they are so similar to the original test that no further explanation is necessary.

Woodworth and Wells[4] have used a test which consists of a number of characters placed at the top of the page, each of which encloses a digit. The characters used are the star, circle, square, cross and triangle. Below this key the page is filled with the characters without the digits, and the test consists in writing the proper digit in the different characters. It is very simple, and lends itself readily to work with children, even in the first grade.

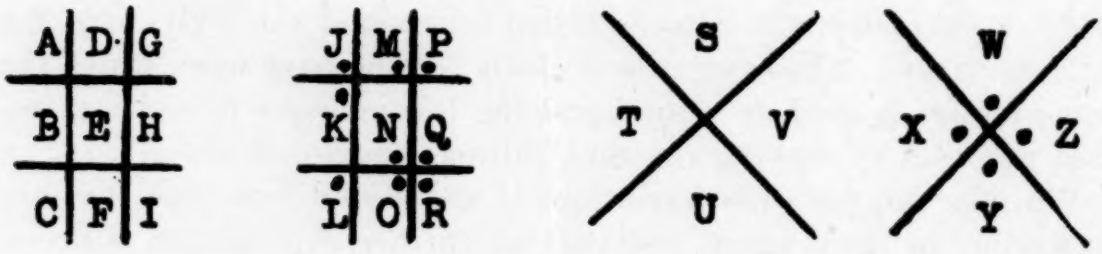
The great objection to be made to the foregoing tests is that the type of learning employed is extremely mechanical. Such tests emphasize a kind of learning which the school has long ago discounte-

[1] JOURNAL OF EDUCATIONAL PSYCHOLOGY, Vol. 1, 373-384.
[2] JOURNAL OF EDUCATIONAL PSYCHOLOGY, Vol. 3, 47-70.
[3] Manual of Mental and Physical Tests, 350-355.

nanced, and which it is trying more and more to eliminate from its work. The effort of the school is to have the learning of the pupil based upon reason and judgment, and thus pitched upon a higher plane than that employed in the usual form of the substitution test. In other words, it certainly would not be safe for a teacher to think that the learning curve of one of her pupils procured by means of the substitution test would be indicative of the pupil's learning in geography, except in the most general way, for geography is largely a reasoning subject, and is being taught more and more as such.

From the standpoint of general psychology the study of any type of learning is important; but from the standpoint of education it is essential that the mental activity be put upon a plane which approaches that of the schoolroom, and if educational psychology is to have a vital influence upon school procedure, it must focus its efforts upon the higher mental activities.

A test which approaches a higher type of learning has been suggested by Healy and used by Goddard[5] in his revision of the Binet Tests. It is a code used during the Civil War, and is as follows:



The suggestion given for the use of this test is that after the subject is shown how to use the cypher he be required to write the expression, "caught a spy." Although it has never been used as a basis for any extended work, one can see possibilities in it for such, and if so used it would certainly involve a higher type of learning than that employed by the tests suggested on the preceding pages.

The test[6] employed by the author for the past two years is shown below. The general form is that used by Dearborn. It is to be

[4]Psy. Rev. Mon. Sup., Vol. 13.

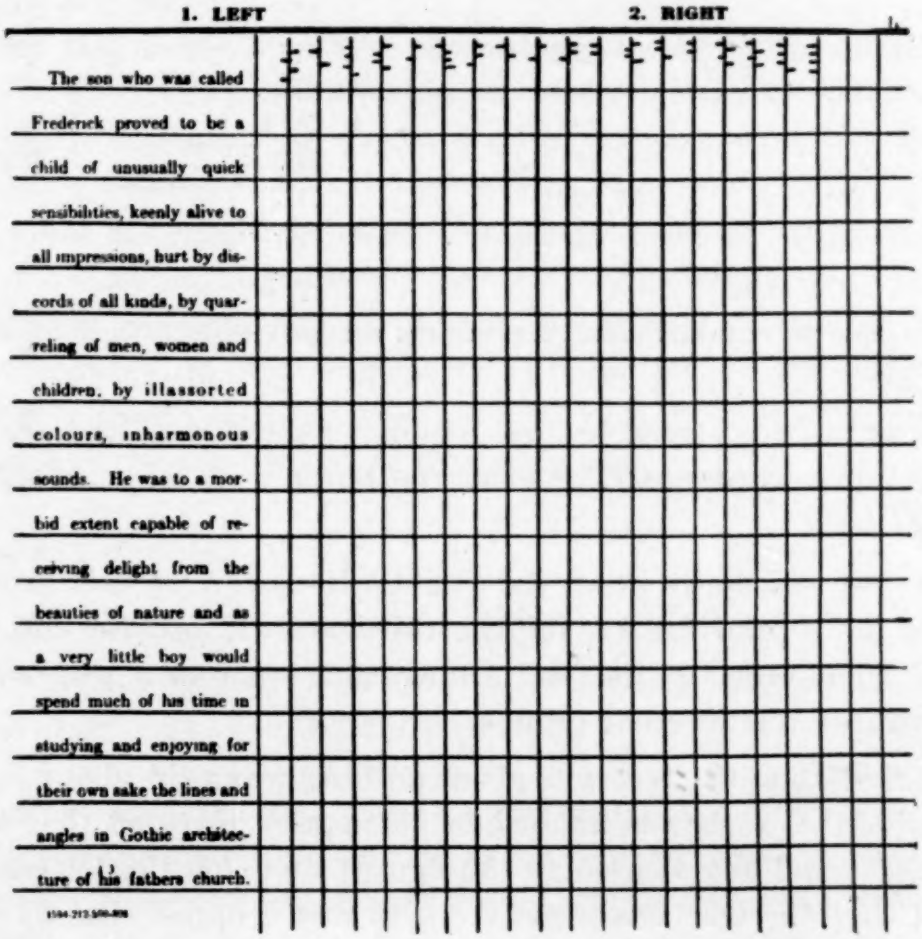
[5]HOLMES. *School Organization and the Individual Child*, p. 10.

[6]The code was suggested to the author by one of his students, Miss Katherine Wells, while she was working on Dearborn's test. It was invented by her father, Mr. Elbert Wells, and published in a book entitled "Outdoor Signalling," by the Outing Publishing Co., New York.

noted that the number combinations make use of only two digits, "1" and "2." In transcribing the printed material, wherever a "1" occurs a short horizontal line is to be made to the left of the vertical line which serves as a "base" line for the particular letter transcribed, and wherever a "2" occurs a short horizontal line is made to the right of the "base" line. The horizontal lines are to be drawn in the order in which the digits occur. Thus H would be ⊣, M would be ⊣⊢, etc. In this manner the first line has been written out on the page shown.

Plate I

Z 2212 X 222 K 1211 G 1122 B 111 V 22 Q 212 J 122
P 211 W 221 F 1121 U 2122 L 1212 C 112 M 1221 Y 2211
D 1111 H 12 I 121 A 11 T 2121 E 1112 N 1222 S 2112 O 21 R 2111


1. LEFT
2. RIGHT
The son who was called
Frederick proved to be a
child of unusually quick
sensibilities, keenly alive to
all impressions, hurt by dis-
cords of all kinds, by quar-
reling of men, women and
children, by illassorted
colours, inharmonous
sounds. He was to a mor-
bid extent capable of re-
ceiving delight from the
beauties of nature and as
a very little boy would
spend much of his time in
studying and enjoying for
their own sake the lines and
angles in Gothic architec-
ture of his fathers church.

The total amount of printed material used for the test is placed upon five sheets similar to the one shown.

About one hundred and fifty students have taken the test. The plan used has been almost identical with that suggested by Dear-

born,[7] except that directions for introspection have been given in much greater detail. The number of possible introspections is large because the test is somewhat complex. This complexity is made apparent by noticing that there are from two to four digits which stand for the different letters, and these digits, in turn, must be transcribed into horizontal lines. It might be said to be a double substitution test.

Another important thing about the test is that it is constructed according to a definite plan, which shows itself very clearly when the letters are arranged in their regular order, as follows:

A 11	H 12	O 21	V 22
B 111	I 121	P 211	W 221
C 112	J 122	Q 212	X 222
D 1111	K 1211	R 2111	Y 2211
E 1112	L 1212	S 2112	Z 2212
F 1121	M 1221	T 2121	
G 1122	N 1222	U 2122	

This key is comparatively simple and can be learned in a short time.

The letters are placed in three groups of seven each and one group of five. The word "AHOV" gives the letter with which each group begins.

The first two digits in all the combinations for the first group are 11, for the second are 12, for the third are 21, and for the fourth are 22. The other digits used follow each other in a way which is constant for the different groups.

The first time the test was given nothing was said about the key, and after the work was handed in an inquiry revealed that no one had discovered any system to the figures used for the letters. The second time the test was given the hint was dropped that by grouping the letters in certain ways the learning could be facilitated very much; but a canvass of the class showed that no one had done anything of this sort. The third time the explanation was clearly made

[7] JOURNAL OF EDUCATIONAL PSYCHOLOGY, Vol. 1, page 379.

that there was a principle running through the combinations, and that the discovery of it would be of great help, but no one made such a discovery.

The problem now is to evolve a technique which will make it incumbent upon the subject to work out the principle running through the combinations. It is quite evident that this will have to be some motive other than that established by a mere speed test. It is possible that a test for retention which would follow the experiment at some stated time can be used.

The possibility of having the subjects put system and organization into their work, and the possibility of measuring the retention due to this kind of work, are two of the best points in the experiment.

Another possibility is to have the test put in such a form that the key can be given first. This would be an easy thing to do from the standpoint of technique, and would certainly give some interesting and valuable results.

The curves obtained so far have been very similar to those published by Dearborn and Starch, but the large number and the different types of associations have been exceedingly interesting. The types of imagery, the motor element of both the eye and hand, the varying degrees of neatness in the work, as well as many other points, seem to make the experiment a promising one.

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AN EXPERIMENT WITH 'UNDIFFERENTIATED' INSTRUCTION.

Two years ago the committee on method of the Leipzig *Lehrerverein* began an experiment on the instruction given in the first three school years. Instead of giving the work of these years as three distinct units with formal lines drawn between subjects and grades, it was proposed to break down these lines and use what might be termed 'undifferentiated' instruction' (*Gesamtunterricht*). The experiment was to be in reality one involving the principle of *concentration;* there seems actually to have been no attempt to hold rigidly

to a central core for all the work. About thirty children, boys and girls, of average ability were selected from *Bürgerschule* 11 and placed in one room under charge of *Lehrer* Brückner, who was to be free to follow any order in instruction that he saw fit. Absolute freedom as to order and method was to be allowed.

A visit to this classroom will convince any careful observer that the results of the experiment will be affected more by the fine teaching ability and breadth and personality of the teacher than by any factor lying in the methods of instruction as such. While a man of middle age with good scholarship and psychological insight, Mr. Brückner still has all the patience and kindness of an ideal kindergarten teacher. It is an inspiration to see him teach. He makes large use of his associations with the children on the playground to aid and to supplement his instruction.

The experiment has now been going on for two years, and a report on it is in preparation. According to Mr. Brückner three results are already quite clear: first, the freedom of the instruction has added remarkably to the interest and happiness of the children; second, the work in all the subjects except arithmetic has been equal to, and in many cases better than, that in the other regular classes of the same grades; and third, the arithmetic work has been distinctly inferior to that of the other children with the same amount of schooling. Certain methods of conducting the experiment are, of course, open to criticism; but no one can doubt that experiments of this kind must play a larger róle in the future development of experimental pedagogy.

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COLLEGE MARKING SYSTEMS.

The demand[1] for a "rational college marking system" appears to be securely based in so far as it maintains that the ranking marks have little meaning unless the percentage of men admitted to each rank accords with a recognized standard. (For example, A, 10 per cent.; B, 15 to 20 per cent.; C, 40 to 50 per cent.; D, 15 to 20 per

[1]Compare SMITH, this JOURNAL, September, 1911.

cent.; failure, 10 per cent.). But the mark of failure is not a ranking mark; it indicates that the student would better not proceed along a certain line of work without repeating the subject in which he has failed. Hence it seems that the ideal number of failures must always be just none at all. Whereas to give A to 100 per cent. of the men would make nonsense of all ranking marks. The "probability curve" is hardly competent to decide that, because 10 or 3 per cent. of the men are to be marked A, 10 or 3 per cent. of the men must repeat the subject. It is significant that, when the Michigan Department of Literature, Science and the Arts adopted the scale suggested above, there was an approach to the percentages named, except that the percentage of failures continued below 3 per cent. instead of approaching the 10 per cent. required by a symmetrical imagination.

This distinction between ranking and passing marks appears to be fundamental. Granting that more men are passed in some classes and fewer in others than we believe should pass, it hardly seems the proper remedy to tell each professor that in the long run we shall expect a certain per cent. of his men to do the work so poorly that they must repeat the subject in whole or in part. It seems that under proper conditions no one would be invited to commence a term's work with the expectation that he must fail and repeat it. With due attention to planning the work, admitting men to classes, and keeping track of their progress, it often seems possible, even now, to insure that none shall fail.

PERCY HUGHES.

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INTERVALS IN ECONOMICAL LEARNING: A CORRECTION.

To the Editor of the Journal of Educational Psychology:

Dear Sir—Will you kindly give space for the following correction of a statement made by Mr. Pyle in his article on Economical Learning in the March number of your JOURNAL?

In discussing a report of experiments published in Volume I of the JOURNAL he states: "Only one condition should be varied at a time. If we start out to settle the question of interval, we should

keep the time constant, and if we try to settle the question of time, we should keep the interval constant. Dearborn does not compare 10 minutes a day with 5 minutes a day, but with 5 minutes *twice* a day, which is quite a different matter." The trials in the experiments referred to were in each case ten minutes in length—in one series once a day, in the second series twice a day. The length of the periods of practice was, therefore, kept constant and the interval alone varied.

The length of the periods of practice was not given in the original article referred to, since the article was not written as a report of results, but as a description of experiments in education available for use as class experiments. Mr. Pyle has evidently made a calculation as to the time and has possibly been misled by an error which appears on page 384, line 14, of the article referred to. The section should read "Section A completed the test in 16½ days of practice; section B in 18 *half* days (instead of days) of practice with two intervals a day at about twelve hours apart."

May I be permitted to add that undoubtedly the varying of one condition at a time is the logical way to attack the problem. Nevertheless, because of the very large amount of experimentation involved, it is quite possible that for one interested in the results alone, and not in the relative effects of the time factors, reliable calculations as to economical learning may be reached more rapidly by judicious variation of the length of the period of practice and of the interval between practice *at the same time.*

There appears also to be some tendency in present experimentation to neglect the fact that both factors may vary according to the *sort* of work done and that different intervals of time when associated with periods of practice suited to them may give equally good results.

Very respectfully yours,

WALTER F. DEARBORN.

Harvard University.

THE
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EDITORIALS.

AMATEURISM IN BINET TESTING ONCE MORE.

One way of making a strong impression is by repetition. And this desire, then, to be emphatic, must be our excuse for repeating here the burden of an editorial set forth in these columns in February of 1912. We then said: "Our large city school systems, with a few conspicuous exceptions, have not yet realized the imperative need of establishing psychological clinics or bureaus of child study, or even of employing a consulting psychologist. When psychological examinations come to be introduced, they tend, failing a psychologist, to fall into the hands of medical inspectors, which is bad enough, or to be assigned outright to classroom teachers, which, perhaps, is worse." And nothing that has developed in the use of the Binet tests during the past year has led us to alter this conviction. Rather, the really capable critiques—like, for example, the address given by Professor Stern of Breslau at the recent German Congress for Psychology, and now published in monograph form—while confirming and strengthening our confidence in the general value of the root principle of the method, reveal more and more difficulties in the administration and appraisement

of the tests themselves. We need only refer to the very bothersome question as to how accurate inferences can be made from the results of a test to the practical mental status of the child—to his classification, in other words, as normal, backward, moron, etc.

We are led to these remarks by the report that the medical inspectors in the city of Pittsburgh, seemingly inspired by the misleading assurances of certain writers who state that the Binet tests, in the hands of physicians, nurses, teachers and other laymen, constitute an "amazingly accurate" and infallible measuring rod, now aspire to take over all the psychological phases of investigatory work in the Pittsburgh school system. And we can only express our hopes that these reports are unfounded, or that at least those in authority may be led to understand that for a person, whoever he may be, without extensive psychological training to attempt to diagnoze the precise mental status of a school child is about as absurd as for a mere psychologist to attempt to diagnoze incipient tuberculosis or any other obscure pathological condition. G. M. W.

WORK NOT A MEASURE OF EFFICIENCY.

One of the most mischievous sources of error in experimental pedagogy at the present time is the assumption that achievement is a measure of capacity. A few years ago it was thought that we could measure fatigue in terms of the "work curve," but, as has been shown in the last fifteen years, the change in quality and quantity of work under strain varies not only with fatigue, but also with numerous other factors inseparably associated with it. Indeed, it has been clearly shown that, in many of the most strenuous mental occupations, oncoming fatigue is not signaled by loss in capacity for work either quantitative or qualitative; for, like a race horse, the mind does its best after it has been worked into a heat. The increase in excitement, oncoming automatisms, and many other kindred factors often more than offset the loss through fatigue. This principle is seldom adequately recognized in current investigations on the value of certain hours of the day, on the effect of certain stimuli to action, or on the influence of various conditions of work. There is great need at the present time of a thorough analysis of the work curve in order that the factors entering into this may be taken into account and, if possible, controlled in educational experiments upon efficiency. C. E. S.

NOTES AND NEWS.

At the recent session of the Ohio Legislature it was enacted that a survey should be made of all the educational interests in the State. The survey will be in charge of Dean W. W. Boyd of the department of education of the Ohio State University, and upon its results will be based future legislation on educational matters.

An important aspect of the International Congress of School Hygiene, to be held at Buffalo, August 25-30, will be a systematic agitation for the extension of medical inspection to all the schools of the United States.

A series of psychological clinics will be conducted in connection with the Mental Hygiene Exhibit to be held at the International Congress of School Hygiene in Buffalo next August. Demonstrations will be made of various psychological tests of individual diagnosis and of group tests which have been used to measure the mental improvement produced by the application of rational principles of mouth hygiene, and which have also been used to measure the differences in the rate of mental growth between epileptic and public school children. The clinics will be under the supervision of Dr. J. E. W. Wallin, director of the psychological clinic and professor of clinical psychology in the School of Education, University of Pittsburgh.

The third session of the Johns Hopkins Summer School, July 1-August 12, offers an attractive list of courses for teachers. Professor Buchner gives the course in educational psychology, Prof. Fletcher B. Dresslar, George Peabody College for Teachers, offers courses in school hygiene and principles of education, and courses in administration, supervision, and methods are announced by Superintendent Cook of Baltimore County, Principal Anna Brochhausen of Indianapolis, Assistant Superintendent Josephine B. Stuart of New Bedford, Mass., and Miss Florence M. Lane, principal Model Rural School, Kirksville, Mo., State Normal.

Among the visiting professors in education and psychology at the Dartmouth Summer School will be Associate Superintendent Clarence E. Meleney, New York City; District Superintendent Albert Shiels, New York City, and Dr. Raymond H. Stetson, professor of psychology, Oberlin College.

At the six weeks' course given in Knoxville last summer at the University of Tennessee twenty-five hundred teachers were present from twenty-four States, including many from Pennsylvania, New

Jersey, Delaware and Maryland. This year two hundred courses will be given by almost as many instructors. Among those to be present are Miss Julia C. Lathrop, chief of the Child's Bureau of the United States Department of Labor; Dr. and Mrs. Southwick of Boston; Prof. B. T. Baldwin of Swarthmore, Prof. George B. Foster of Chicago and Edward Howard Griggs. Doubtless a great number of people interested in education will take advantage of these courses, since the low tuition, cheap board, special rates and delightful climate make this a splendid opportunity for teachers in this neighborhood to come into contact with teachers from all parts of the United States and especially from the South.

The budget of the University of Illinois, now before the Legislature, contains an item for $120,000 for a School of Education building. This building, if erected, will provide classrooms and laboratories for the School of Education, and quarters for a medium-sized secondary school to be used for observation and training purposes.

At the Conference and Exhibit on Mental Hygiene, held in Pittsburgh, April 21-26, the psychological clinic of the University of Pittsburgh had on display a variety of graphs, charts, test blanks and publications.

At the meeting of the Philosophical Society of the University of Virginia, Friday, May 9, Prof. W. H. Heck delivered an address on "Experimental Education."

Prof. Charles Hughes Johnston of the University of Kansas has accepted a professorship of secondary education in the School of Education, University of Illinois. He will begin his work in Illinois in September, 1913.

Professor Ira Richardson, head of the department of education and training, Northwest Missouri State Normal School, has been elected president of that institution. Professor Richardson succeeds President H. K. Taylor, who has resigned on account of ill health.

According to the daily press, Prof. Ernest C. Moore, head of the department of education, Yale University, has been invited to become professor of education in Harvard University in association with Prof. Paul H. Hanus. It will be recalled that Professor Moore was connected with Professor Hanus in the New York School Inquiry Commission.

CURRENT PERIODICALS.

(In this section only such articles will be noticed as bear directly or indirectly upon the interests of this Journal.)

TEACHERS' COLLEGE RECORD. Vol. XIV, No. 1, January, 1913. LEONARD RIGHTER. *The Educational Survey Preparatory to the Organization of Vocational Education.* 3-43. The schools exist for the benefit of the people, but in many communities neither the people nor the school authorities know whether or how the people are benefited. There is an increasing demand for more knowledge in this matter, and hence a growing interest in educational surveys. The present article is a valuable contribution to the technique of an educational survey.

ROBERT J. LEONARD. *Social Phases of Industrial Life and Their Relation to Industrial Guidance.* 44-64. The school must know the industrial life of the community in order to give proper advice to pupils regarding the choice of a life work. Some important social phases of community life are here discussed and illustrated by reference to the industrial conditions of New York City.

No. 2, March, 1913. *The Curriculum of the Horace Mann Elementary School. Arithmetic, Geography, History, Music.* Pp. 76. In arithmetic emphasis is laid on the selection of problems from the environment of the pupils, speed and accuracy in fundamentals, self-dependence in problem work, and free use of number games. Geography is begun in the third grade, and is dominated throughout by social and economic considerations. History begins in grade I with the festivals of the home, is then extended to early life on Manhattan, colonial history, Greek, Roman and medieval history, and closes with an intensive study of American history in grades VI and VII. The curriculum in music will be very helpful to less carefully organized schools.

ZEITSCHRIFT FUER ANGEWANDTE PSYCHOLOGIE. Vol. VII, No. 1, December, 1912. MAX HENTSCHEL. *Two Experimental Investigations on Children in Tone Psychology. I. Judgment of Musical Intervals.* 55-69. Tests of the judgment of musical intervals from the second to the octave were made on 491 school children from nine to fourteen years. The greatest uncertainty in the judgment of the second tone was found in the case of the major second. The girls were from 2 to 3 per cent. behind the boys in accuracy of judgment.

OTTO LIPPMANN. *Experimental Studies in Arithmetic (Collective Review).* 97-107. An analytical discussion of the method and results of three recent investigations to determine the relative difficulty of combinations in addition and multiplication.

W. MATZ. *Report on the Psychological Phases of the Fourth International Congress for the Teaching of Drawing and Art, Dresden, 1912.* 108-120. A large part of the program was devoted to the consideration of the psychological foundations of drawing, and studies of children's drawings.

ZEITSCHRIFT FUER PAEDAGISCHE PSYCHOLOGIE UND EXPERIMENTELLE PAEDAGOGIK. Vol. XIV, No. 1, January, 1913. N. ACH. *Studies of the Will and Their Relation to Education.* 1-11. Emphasis is laid on the means by which inhibition and reinforcement of volition are furthered, and the author discusses the part that training may play in the development of determining tendencies.

ALOYS FISCHER. *Important Problems of Kindergarten Reform.* 11-17. The present wave of experimental investigation into the mental nature, aptitudes, and interests of school children has left the kindergarten altogether to one side. The author discusses several problems of the kindergarten which call for experimental study, and points to the experimental kindergarten of the Munich Teachers' Association as the type of organization that is needed for the furtherance of such study.

L. W. WEBER. *On Normal and Pathological Lying.* 18-29. Emphasizes the importance of distinguishing carefully between the two, since the ordinary punishments and restraints will be ineffective with the pathological liar. The aim of education in truth-telling should be the displacement of egoistic by altruistic motives, and the development of self-control.

M. SCHAEFER. *Elements of the Ethical Judgments of Young People.* 47-59, 90-98. The author propounded to 1250 elementary school pupils from twelve to seventeen years of age the question, "Why is stealing forbidden?" The analysis of the answers shows that in spite of the special religious training which these German young people received, religious motives play an insignificant role in their moral judgments after the fourteenth year. The social motive rises to a high position with the normal children, while it yields to the egoistic motive in the feeble-minded.

PAUL WAGNER. *On the Mathematical Treatment of the Results in Investigations of Immediate Memory.* 60-63. A series of formulae whereby the graphic representation of the results of memory tests may be translated into numerical expression.

No. 2, February, 1913. GUSTAV DEUCHLER. *Psychology and Morphology of School Work.* 81-90. The teacher must necessarily work with the class rather than with individual pupils, yet the influence of class spirit upon the work of the teacher and the class has received litle scientific consideration. The author outlines a program of investigation in this important field.

PUBLICATIONS RECEIVED.

(Notice in this section does not preclude a more extended review.)

A. R. ABELSON. *Tests for Mental Deficiency in Childhood.* Reprinted from *The Child,* October, 1912. 1-17.

The author attempts to supply the deficiencies in existing tests by elucidating the principles upon which such tests are essentially based. No tests are suggested that are essentially new.

JOHN ADAMS. *The Evolution of Educational Theory.* New York: The Macmillan Company, 1912. Pp. ix, 410. $2.75 net.

The most important work that has come from the pen of this fertile and stimulating writer. In the twelve chapters of the book the author deals with the nature and scope of education, the characteristics of the educand, the prehistoric and the historic development of education, the social and the individual aim, formal *versus* specific training, humanism and the culture aim, Rousseau and naturalism, Froebel and the idealists, quantitative measurements in education, and the educational outlook. In the final chapter he calls for a more detailed personal record card which shall indicate the physical and mental status of the educand, shall be revised at stated intervals, and shall accompany him throughout his school life. This might enable us to attain an educational efficiency comparable to the industrial efficiency for which all large manufacturing concerns strive in their elaborate systems of records.

Addresses and Proceedings of the National Education Association, Chicago, Ill., 1912. Ann Arbor, Mich.: National Education Association, 1912. Pp. 1427.

FRANK P. BACHMAN. *Report Upon Promotion, Non-Promotion and Part Time.* New York: Committee on School Inquiry, 1913. Pp. 114.

This is part of the report of the Hanus Commission for the investigation of the "Educational Aspects of the Public School System of the City of New York." It is the most thorough and elaborate study of non-promotion ever made in this country. Dr. Bachman urges the adoption of a uniform and detailed report sheet for each

teacher which would furnish specific data as to the number of pupils that drop out of school each term and the reason therefor.

LA REINE HELEN BAKER. *Race Improvement or Eugenics.* New York: Dodd, Mead & Co., 1912. Pp. 137. $1.00 net.

This little book presents in plain, simple fashion some of the most important topics in practical eugenics. The emphasis on the right of the child to be well born, the duty of society toward the child whether born in wedlock or not, the encouragement that may and ought to be offered to fit matings, the rights of woman as man's equal in the propagation of the race, the precautions that society should take to prevent the procreation of the unfit, are subjects that deserve the careful consideration of every serious-minded person, and the interest manifested by the intelligent women of the country in such discussions is a most encouraging symptom.

Bibliography of Child-Study for the Years 1910-1911. Compiled by Clark University Library. Bulletin No. 498. Washington: Bureau of Education, 1912. Pp. 90.

EDGAR EWING BRANDON. *Latin-American Universities and Special Schools.* Bulletin No. 504. Washington: Bureau of Education, 1913. Pp. 153.

A richly illustrated account of the work of higher institutions of learning in Central and South American countries.

R. C. BROOKS. *Report of the N. E. A. Committee on Teachers' Salaries and the Cost of Living.* Ann Arbor: Published by the Association, 1913. Pp. 328.

The secretary of the committee, who is a professor of political science in the University of Cincinnati, here presents a mass of material, very uneven in value, on the increased cost of living, the economic and social status of teachers in a select group of American cities, and typical plans and schedules of teachers' salaries, tenure and pensions.

WILLIAM FORBES COOLEY. *The Principles of Science.* New York: Henry Holt & Co., 1912. Pp. v, 245.

The aim of the author in this book is "to show how the inquiries of physical science lead inevitably to questions and problems which transcend the field of present-day science, that is, to questions of philosophy." He presents interesting discussions of such scientific concepts as matter, energy, mechanism, law and evolution, leading back to the fundamental postulates of science, and to a consideration of the rationality of the world.

STUART A. COURTIS. *Report on the Courtis Tests in Arithmetic.* New York: Committee on School Inquiry, 1913. Pp. 158.

The Hanus Commission for the investigation of the New York School System endeavored as far as possible to make use of scientific methods of evaluating school procedures, and was fortunate enough to secure the services of Mr. Courtis himself in the application of his Standard Tests in Arithmetic to a representative number of New York school children. Over 33,000 pupils in 52 schools were tested, and the results are tabulated in this report. The data are so voluminous and there is such a formidable array of statistics and graphs that the monograph is difficult to summarize. The most striking fact is perhaps the extreme individual variation in the arithmetical abilities of children in the same grade and school. The results of such scientific measurements show how impossible it is for any school training to equalize native differences in mental ability.

GEORGE VAN NESS DEARBORN. *Nerve Waste.* Boston: Health Education League, 1913. Pp. 29. Seven cents.

This little booklet presents in popular form a statement of the debits and credits of the clearing-house for nervous energy, and gives some pertinent advice for keeping a safe balance on the right side of the ledger.

JEAN FINOT. *Problems of the Sexes.* New York: G. P. Putnam's Sons, 1913. Pp. xiv, 408. $2.00 net.

The author believes that the logical way of arriving at a comprehension of present conditions and tendencies is through historical perspective, and therefore traces the history of the relation between the sexes, and endeavors to obtain a scientific background for the consideration of the present feminist movement. His chief conclusion is that each sex is superior to the other in certain respects, that the mission of each is to supplement the other, and that this can only be attained when woman is not only left free, but given the most favorable conditions to develop her nature to the fullest extent.

JOHN M. GILLETTE. *Constructive Rural Sociology.* New York: Sturgis & Walton, 1913. Pp. xiii, 301. $2.00 net.

The problem of rural education is essentially a social and economic one, and, therefore, all those who are interested in rural schools will welcome this attempt to survey rural conditions from the sociological point of view. "The purpose of this volume is to provide in a clear and untechnical way the fundamental facts upon which judgments about past development, present tendencies and future growth are to be based. It brings together in compact and convenient form a mass of significant facts and it draws sane and careful inferences.

Professor Gillette has shown a clear grasp of the subject and has given us a valuable book which will be welcomed not only in school and college, but by the general reader."

HENRY HERBERT GODDARD. *The Kallikak Family.* New York: The Macmillan Company, 1913. Pp. xv, 121. $1.50 net.

Much has been said and written concerning the famous Jukes family, and the suffering and economic loss which has been inflicted by them upon society. It has never been definitely determined, however, just how much of their depravity was due to heredity and how much might be attributed to the unfavorable conditions of the environment. In the present book Dr. Goddard relates the history of two branches of the same family which he has been able to trace accurately to its division over a century and a quarter ago. In the normal branch all the members are of sound mind and of brilliant attainments in social and professional life. The abnormal branch, started by illicit relations with a feeble-minded girl, numbers four hundred and eighty descendants. Of these one hundred, forty-three have been definitely proven feeble-minded, while only forty-six have been found normal. The rest are unknown or doubtful. It is a fascinating, yet strictly scientific, account of the terrible menace to society which lurks in the unrestricted liberty of the feeble-minded.

G. STANLEY HALL, KENYON COX, STOCKTON AXSON AND OLIVER S. TONKS. *Art Museums and Schools.* New York: Charles Scribner's Sons, 1913. Pp. vii, 144. $1.00 net.

This is a collection of four lectures delivered at the Metropolitan Museum of Art in New York City. President Hall, discussing Museums of Art and Teachers of History, emphasized the value of charts, pictures, etc., in vivifying and actualizing the facts of classical history. The American mind runs to clear, vivid images rather than to abstract problems, yet much of our high school teaching is of the dry, dull text-book sort, with little attempt to render any assistance to the imagination. One of the chief duties of every corps of high school teachers is to enlist the co-operation of their pupils in establishing a school museum. Dr. Axson spoke of the value of the museum for teachers of English, Dr. Tonks discussed its significance for teachers of the classics, and Mr. Cox emphasized its importance for teachers of art.

CHARLES HART HANDSCHIN. *The Teaching of Modern Languages in the United States.* Bulletin No. 510. Washington: Bureau of Education, 1913. Pp. 154.

While the teaching of modern languages has improved wonderfully in the past few years, there is still much to be desired. The chief difficulty is to secure properly trained teachers.

MARCUS HARTOG. *Problems of Life and Reproduction.* New York: G. P. Putnam's Sons, 1913. Pp. xvii, 362. $2.50 net.

This is an interesting series of essays on biological subjects by the professor of zoology in University College, Cork. Of importance for educationists are the chapters on the transmission of acquired characters (in which the author is a firm believer), mechanism and life (a defense of neo-vitalism), the biological writings of Samuel Butler, with especial attention to "Unconscious Memory," interpolation in memory (a study of certain phases of the learning process), and the teaching of nature-study.

EDUARD HITSCHMANN. *Freud's Theories of the Neuroses.* New York: Nervous and Mental Disease Publishing Co., 1913. Pp. 154. $2.00.

A synthetic presentation of the Freudian theory; a most welcome contribution for those who desire to get the gist of this movement.

WILHELM JERUSALEM. *Die Aufgaben des Lehrers an höheren Schulen.* Wien und Leipzig: Wilhelm Braumüller, 1912. Pp. xii, 392. M. 9.

In the past twenty years the number and importance of our high schools have increased in a marvelous manner, and we are now confronted with the problem of providing an adequate supply of teachers for these schools. In the training of secondary teachers we are far behind Germany, and we may well look to her for counsel. The present book, which discusses the status of German Middle Schools and the tasks of the teachers in those schools, gives a clear, definite and intelligible account of what the secondary school teacher should be and do. Perhaps the most important part of the book is the fourth and fifth chapters in which the author presents a lucid and convincing analysis of the didactic, the ethical and the social tasks of the teacher. The book should be widely read by students of secondary teaching in this country.

CLARENCE D. KINGSLEY. *College Entrance Requirements.* Bulletin No. 514. Washington: Bureau of Education, 1913. Pp. 110.

An elaborate statistical study showing the present status of entrance requirements in 204 colleges of liberal arts, 85 colleges of engineering and 31 colleges of agriculture.

N. KRAEMER. *Experimentelle Untersuchungen zur Erkenntnis des Lernprozesses.* Leipzig: Quelle und Meyer, 1912. Pp. 97. M. 3.

An elaborate experimental study of the learning process of five adults. The author used twenty-seven different selections of ma-

terial, all of the same length, but varying in difficulty from the simplest narrative to involved philosophical prose. The "whole" method was used in general, but the subjects were allowed to vary this somewhat on occasion. The plan of procedure was to have the subject read the selection over a sufficient number of times to give the conviction that most of it could be reproduced. After the attempted reproduction a detailed report of introspection on the methods of learning was written out. The reading was then resumed and the process repeated until the selection could be perfectly reproduced. A test of retention was made after twenty-four hours. The monograph is an important contribution to the study of learning.

EMIL KRAEPELIN. *General Paresis.* New York: Nervous and Mental Disease Pub. Co., 1913. Monograph Series No. 14, pp. 200.

A translation from the German by J. W. Moore, M.D. A most important up-to-date chapter from Kraepelin's clinical psychiatry.

ARTHUR MACDONALD. *Bibliography of Exceptional Children and Their Education.* Bulletin No. 506. Washington: Bureau of Education, 1913. Pp. 43.

An annotated list of the important contributions to the subject during the past decade.

ROBERT MACDOUGALL. *Mind as Middle Term.* Reprinted from the Psychological Review, 19: No. 5, September, 1912. 386-403.

All behavior studies imply consciousness and must, therefore, be classed as psychological inquiries in the strict sense of the term.

HUGO MÜNSTERBERG. *Psychology and Industrial Efficiency.* Boston: Houghton Mifflin Company, 1913. Pp. 309. $1.50 net.

This is the most elaborate attempt yet made in English to apply the principles of experimental psychology to economic and industrial conditions. Part I deals with "The Best Possible Man," and gives an account of the limited number of experiments that have been made to determine the fitness of an individual for a given piece of work. This is, of course, merely a matter of comparison and selection, such as is going on all the time, but with scientific methods the selection may be made much more quickly, and great saving may be accomplished. Part II, "The Best Possible Work," discusses learning, attention and fatigue, as applied to industrial conditions. Part III considers the means of producing the "Best Possible Effect" in advertising, displaying and selling commodities.

HUGO MÜNSTERBERG. *Vocation and Learning.* St. Louis: The People's University, 1912. Pp. 289.

An analysis from the psychological point of view of the demands

which are made by the various vocations. The treatment is philosophical rather than experimental. The chief types of vocation considered are those of the engineer, the farmer, the business man, the teacher, the domestic worker, the secretary, the physician, the lawyer and the architect.

GILBERT MURRAY. *Four Stages of Greek Religion.* New York: Columbia University Press, 1912. Pp. 223.

These delightful studies of Greek thought by the Regius Professor of Greek in the University of Oxford grew out of a course of lectures delivered at Columbia University. The first, "Saturnia Regna," limns in clear outlines a picture of the earliest gropings of the Greeks after an explanation of their world; the second, "The Olympian Conquest," traces the evolution of the Homeric gods; the third, "The Failure of Nerve," describes the great wave of pessimism that followed the overthrow of democracy and culture; and the fourth, "The Last Protest," recounts the final unavailing struggle of Greek ideals under Julian to maintain themselves against the "otherworldliness" of triumphant Christianity.

WILLIAM BAXTER OWEN. *The Humanities in the Education of the Future.* Boston: Sherman, French & Co., 1912. Pp. vi, 187. $1.25.

A series of twelve addresses well written and well worth reading. The essential truth of Chapter II, "The Value of Discipline in Education," would not be in the least obscured if cast in the terminology that the investigations of transfer have developed.

MAUD PERRY. *Understanding People Through the Stars.* Rochester, N. Y.: Walrond's Occult Publishing Co., 1912. Pp. 59. 60 cents.

It is a continuous marvel what solemn nonsense some people will accept if it is only presented to them in authoritative fashion. If any one is curious on this point he may safely be referred to the above book.

Problems in Eugenics. Papers Communicated to the First International Eugenics Congress, University of London, July 24-30, 1912. London: Eugenics Education Society, 1912. Pp. xix, 489. 8s.6d. net.

This is doubtless the most extensive and authoritative collection of eugenics papers ever issued, and should be in the hands of all those who are interested in the present status of eugenics propaganda. The Congress, as well as the papers presented at it, was arranged in four sections: Section I, Biology and Eugenics; Section

II, Practical Eugenics, including eugenics and education; Section III, Sociology and Eugenics; and Section IV, Medicine and Eugenics.

Reports of Investigations by Members of the Society of College Teachers of Education. School Review Monographs, No 3. Chicago: University of Chicago Press, 1913. Pp. 45. 53 cents.

The papers of especial interest to educational psychologists are "Psychological Characteristics of the Intermediate Grades," C. H. Judd; "The Abilities of Special Groups of High School Students in the Subjects Which They Studied," G. D. Strayer; "A Study of Association in Children of the Elementary School," E. E. Jones; and "An Experiment with the Courtis Tests in Arithmetic," E. E. Rall.

ARTHUR SCHULTZE. *The Teaching of Mathematics in Secondary Schools.* New York: The Macmillan Company, 1912. Pp. xx, 367. $1.25 net.

This is an exceedingly important work on the teaching of high school mathematics. Its chief object is "to contribute towards making mathematical teaching less informational and more disciplinary. Most teachers admit that mathematical instruction derives its importance from the mental training that it affords, and not from the information that it imparts." Nevertheless, "students still learn demonstrations instead of learning how to demonstrate." This constitutes a challenge to the experimentalist to determine to what extent students can learn "how to demonstrate."

F. SCHUMANN. *Bericht über den V. Kongress für experimentelle Psychologie in Berlin, April* 16-20, 1912. Leipzig: J. A. Barth, 1912. Pp. xxv, 324. M. 11.

This report contains many papers that are of importance for educational psychology. Chief of these are: W. L. Stern, Psychological Methods of Testing Intelligence; K. Marbe, The Significance of Psychology for Other Sciences and for Practical Life; O. Kulpe, The Significance of the Modern Psychology of Thinking; B. Hart and C. Spearman, On General Mental Ability; K. Bühler, The Development of Abstraction in School Children; W. Peters, The Inheritance of Mental Capacities; S. V. Maday, Psychology of the Choice of a Vocation; A. Grübaum, Observations on Reflection; Exhibition of Tests and Apparatus by the Institute for Applied Psychology. A more extended account of the Congress will be found in this JOURNAL, Vol. III, No. 8, October, 1912. Page 452.

DAVID EUGENE SMITH AND CHARLES GOLDZIHER. *Bibliography of the Teaching of Mathematics,* 1900-1912. Bulletin No. 503. Washington: Bureau of Education, 1913. Pp. 94.

Includes 1849 titles on the teaching of mathematics.

WILLIAM STERN. *Die psychologischen Methoden der Intelligenzprüfung und deren Anwendung an Schulkindern.* Leipzig: J. A. Barth, 1912. Pp. iv, 106. M. 3.00.

This is the most elaborate critical discussion of the Binet-Simon and other mental tests that has yet been presented. In his introduction the author considers the aim and general function of intelligence tests and enumerates some of the more important practical questions which create a demand for such tests. Section I gives a survey of the various types of tests that have been proposed, Section II discusses the Binet tests, and Section III suggests a more delicate gradation of intelligence tests by the use of the ranking method. No student of mental tests can afford to neglect this monograph.

WILLIAM SENACA SUTTON. *Problems in Modern Education.* Boston: Sherman, French & Co., 1913. Pp. 352.

A series of twelve addresses and essays, written for various occasions and dealing with important questions in practical education. The unifying principle of these papers "is that of concrete idealism, which is the controlling, characteristic attribute of human evolution, and which insists upon the wisdom and necessity of reckoning with environment in order to obtain desirable results."

EDWARD L. THORNDIKE. *An Introduction to the Theory of Mental and Social Measurements.* Second edition, revised and enlarged. New York: Teachers' College, 1913. Pp. xi, 277.

By this revision of his book on Mental and Social Measurements, Professor Thorndike has decidedly increased the debt which students of educational psychology owe him. With the rapid extension of the application of experimental methods to the study of educational problems it becomes increasingly imperative for the student of education to have some familiarity with the theories and methods of quantitative measurement in order to read and understand current discussions in education. For this purpose there is nothing that can equal the present book.

LOUIS WALLIS. *Sociological Study of the Bible.* Chicago: University of Chicago Press, 1912. Pp. xxxv, 308. $1.50 net.

The perusal of this masterful book opens up an entirely new view of the Bible as the chronicle of a great social struggle. "The book

is an evolutionary study of Christendom. * * * It takes the standpoint of what is called 'pure science.' It seeks to know the historical facts of the subject before it, and to interpret these facts in their actual, historical connections. * * * It is practically a general thesis on the religious phase of civilization, approaching the development of human society from the standpoint of religious interests. It aims to show that the Bible may be taken as a point of departure for the investigation of the entire process of social evolution."

WILLIAM CECIL DAMPIER WHETHAM AND CATHERINE DURNING WHETHAM. *Science and the Human Mind.* New York: Longmans, Green & Co., 1912. Pp. xi, 304. $1.60 net.

This book aims to give in popular form "a critical and historical account of the development of natural knowledge." The chapter headings include "Science in the Ancient World," "The Medieval Mind," "The Renaissance and Its Achievement," "The Physics of the Nineteenth Century," "The Coming of Evolution," and "The Latest Stage." Owing to the extent of the field covered the treatment is somewhat sketchy and impressionistic.

CHARLES EDGAR WITTER. *Pragmatic Elements in Kant's Philosophy.* Chicago: University of Chicago Press, 1913. Pp. 76.

"There is a near approach to the pragmatic method in (Kant's) three-fold synthesis of apprehension, reproduction and recognition. * * * Pragmatism takes one of its chief inspirations in breaking away from the representational view of knowledge. * * * Kant would seem to be in harmony with this attitude in holding that the mind furnishes its own constituent factors. * * * He differs from the pragmatist in abstracting sharply this work of the understanding in thus furnishing the relating factors."

A. DUNCAN YOCUM. *Culture, Discipline and Democracy.* Philadelphia: Christopher Sower Company, 1913. Pp. x, 320.

This is perhaps the most significant contribution of the year to educational theory. The author describes his work as "not so much an attempted solution of the educational problem as an effort to formulate it."